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RetroMagazine World

future days are back

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SUPER TURRICAN 2

THE RETURN ON AMIGA AGA

NOLAN BUSHNELL
AN AGELESS INNOVATOR

HARDWARE
ATARI VCS/2600

FOCUS on Retro Gadgets and ATARI '50
PROGRAMMING: MSX Basic code optimisation - Commodore 64 for beginners
Turbo Pascal + Assembly - May the FORTH be with us : Part Four - Debugging in assembly
Commodore 64 PLA for Dummies - Japan Part 21: Live in your world, play in ours!
RETROSPECTIVE: Zak McKracken, the Game B-Movie
Sensible World of Soccer, the Italian community
ListAmiga: The 5(+1) best Amiga football games of the World Cup in Qatar
Nintendo iQUe: The (UN)protections - GRUNDY NEW BRAIN, the renegade Sinclair
... columns, interviews, reviews and more!

To infinity and beyond...

The year 2022 is coming to a close, so it is natural to do some reflections. As if the pandemic were not enough, then a war broke out that may drag on for a long time. Finally, the fear of being left out in the cold and penniless with creeping inflation eating away at our hard-earned savings.

Let's cling to RetroMagazine World as a providential lifeboat in a stormy sea of events.

But it is not an escape from reality. All RetroComputing enthusiasts form a worldwide community connected by the Internet, and we believe that sharing ideas, games and projects should foster brotherhood among people. Then we feel more responsible and less frivolous.

Our editor Francesco Fiorentini compared the early issues of the magazine, when they reviewed old 80s and 90s games, with the latest publications where they talk about video games made in this period. You got it right! New stuff, not just memories of the past! In addition to video games, we also publish articles where we describe how to make some repairs or how to somehow connect an old computer to modern devices (laptops, LCD monitors, memory cards, etc.).

There is no shortage of tales of historical anecdotes and educational articles that could be an inspiration and improvement in everyday work.

In addition, RetroMagazine World continues to pursue the project of forming itself into an association to which one can subscribe and wants to always be there to give voice and space to anyone who has something interesting, like a self-respecting news magazine.

In short, the journey that began 5 years ago continues, and like those brave astronauts who first saw the Earth from the Moon, the Editors of RetroMagazine World wish you a Merry Christmas, a better 2023, and may God bless all of you on dear Earth!

Alberto Apostolo

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Atari VCS/2600

by Leonardo Miliani

This is it! The most "gift-giving" time of the year is here! Who would pass up requesting a nice gift for Christmas? I don't think anyone. And not even the kids of 1977 would be able to resist asking to be given that new console recently put out by none other than the then king of arcade video games, Atari. Yes, we are talking about the Atari VCS, which in the years to follow would come to be known as the 2600: a console capable of being sold in some 30 million units and remaining on the market for some 15 years. True, we have already talked about the console in No. 2 of our magazine, but this time we want to do so a bit more in depth, analyzing in great detail the history of this illustrious retro-antennae.

A bit of history

Nolan Bushnell was born and raised in Utah. While attending college he earned a few dollars working at the Lagoon amusement park in Farmington, where he was made manager of the coin-operated electro-mechanical gaming machines, forming a culture not only about the entertainment systems industry but also making his own the concept that people must pay to play. After college he went on to college, and it was at the University of Utah in Salt Lake City, where he was taking an engineering course, that he came into contact with one of the very first examples of video games in history, Spacewar (fig. 2). It is a rudimentary space-themed game running on a PDP-1 connected to a monitor and controlled by an equally rudimentary joystick fashioned from a model airplane remote control. Nolan Bushnell is thunderstruck by the images depicting 2 spaceships shooting at each other trying to destroy each other. Bushnell finished college, got married, and in 1969 moved to Silicon Valley, for the uninitiated, the area of the planet that since the second half of the last century has been the home of the digital revolution and the home of many of the largest hi-tech industries. In this substratum that smells silicon everywhere, he finds work at Ampex, a company that produced systems for audio/video recording on magnetic tapes. There he meets Ted Dabney, an electrical engineer who joined Ampex in 1961 after a couple of stints at other companies. Here the two become friends and begin dating. Bushnell learns that at the Stanford Artificial Intelligence Laboratory, a section of Stanford University, they have made a smaller version of Spacewar based on a PDP-11 and called the Galaxy Game: the latter is made with a cabin cruiser where it houses the computer, monitor, controls for the players, and, most importantly, a coin-operated game start system. Bushnell shows Dabney Galaxy Game and together they begin to fantasize about creating their own business based on the then-emerging video games.

Fig. 1: Atari VCS
(source: Wikimedia - author: Evan-Amos)

The two founded Syzygy in 1971 and produced, towards the end of the year, their first arcade, "Computer Space" (fig. 3): it is a game that takes up the concepts of Spacewar and Galaxy Game, with 2 spaceships moved by as many players facing each other in a space environment. Compared to the two games from which it takes its cue, Computer Space is much cheaper being based on a motherboard with a set of integrals that replicate only the game in question and not in an actual computer like the other systems. Distributed by Nutting Associates, however, the game is not very successful because it is difficult to play. Bushnell and Dabney proposed to William Gill Nutting, the head of Nutting Associates, to make a simplified version, but he did not agree, so Bushnell and Dabney decided to distribute it themselves. Having changed the name of the company, which becomes Atari in 1972, the two abandon the idea of a sequel to Computer Space and, as soon as they see the tennis game being distributed with the new Magnavox Odyssey console, they make a clone of it, thanks to the help of Al Al Alcorn, a former Ampex colleague of theirs, whom they convince to follow them into the newly formed Atari. The game is marketed as Pong, and is a resounding success! It is quickly exported outside the United States and domestic versions are also made. By the end of 1974, when it is taken off the market,

Fig. 2 - Spacewar!
(fonte: Wikimedia - autore: Kenneth Lu)

8,000 units of the arcade alone have been sold.

The success of Pong launched the company into the video game orbit, with other titles reinforcing Atari's name as the undisputed market leader. Despite the excellent sales, however, Bushnell has to contend with exorbitant development costs: it takes about $50 to $100,000 to make an arcade game, because a dedicated board with dozens, if not hundreds, of integrateds is developed for each game. In addition, the game has a really short life: if you leave out the unnaturally long success of Pong, an arcade yields box office for a few months, then the competition makes it obsolete and you have to start with a new project. Home games are also short-lived: when a game is successful, quickly a large number of clones appear on the market so that, after a short time, something new has to be introduced to recover customers. For this reason Bushnell starts looking for a system to make a hardware base that can be reused and not have to develop a system from scratch again. In late 1973 Atari acquired Cyan Engineering, an electronic device development company based in Grass Valley and founded by Steve Mayer and Larry Emmons, both former colleagues of Bushnell and Dabney in the Ampex days. The interest in this small company stems from the fact that Mayer and another engineer named Ron Milner had already begun to study a system for electronic games based on new programmable devices that were appearing on the market at that time, microprocessors. The underlying problem is cost: the few offerings still available, mainly Intel and Motorola, cost hundreds of dollars per unit, which would cause the final product to have such a high purchase price that it would place it in a market segment accessible to few. Atari, however, is beginning negotiations with Motorola for its 6800.

Things changed in 1975, when MOS Technology unveiled the 6502, a CPU that cost only $25. Mayer and Milner meet with Chuck Peddle, group leader of the designers who created the 6502, and negotiations begin. Twenty-five dollars is still a lot, so Peddle reveals to them that MOS is also developing a scaled-down version of the CPU to be called the 6507. Atari and MOS come to a final agreement: for $12 a pair of integrateds, the 6507 and the RIOT, a chip that will be used as an input/output manager, is provided. Atari also asks for a second supplier for the CPUs, and MOS suggests Synertek, which already produces its chips under license. At the same time, negotiations with Motorola are terminated. Peddle also suggests that Atari engineers make contact with Microcomputer Associates, a small company founded by

Fig. 3 - Computer Space, the first arcade made by Nolan Bushnell before he founded Atari (source: Wikimedia - author: Flippers)

Manny Lemas and Ray Holt that provided debugging systems to MOS and also produced the JOLT microcomputer, based on the MOS 6502. According to Peddle, the JOLT may prove useful as a basis for console development. This occurs, because Milner is able to run a replica of the arcade "Tank," a game produced by subsidiary Key Games, on the JOLT itself.

Stella

Mayer and Milner therefore begin the development of a device derived in part from the JOLT. Toward the end of 1975, Joe Decuir, fresh out of Berkley, who had already begun his own work on the 6502, is hired. Decuir begins the testing phase of the first prototype developed by Mayer and Milner to which he attaches the name "Stella," after the brand of his bicycle! Harold Lee, one of the engineers working on the Stella prototype, knows that an old acquaintance of his, a brilliant engineer named Jay Miner, is working at Synertek, which has a contract as a secondary supplier of MOS chips. Lee proposes Miner's name to design an auxiliary chip to power the nascent console. Atari makes a deal with Synertek and Miner moves on to work on the Stella project. Miner designs the TIA, from Television Interface Adaptor, which is used to generate the video signal and sound effects. By early 1976 Stella is completed: it consists of the 6507 CPU, TIA, RIOT, and a connector for connecting game cartridges. While Alcorn is in charge of training game developers by presenting the machine's technical features, Bushnell begins to deal with marketing: he hires Gene Landrum, a consultant who has already worked with Fairchild and on its future Channel F console, who is to draw up a report on what is required of the console in order for it to succeed in the marketplace. In his report, Landrum indicates that the console must be an aesthetically appealing and possibly wood-finished object to fit into family living rooms, and the cartridges must be "idiot and child-proof," indicating that anyone must be able to handle and insert them. James Asher to Douglas Hardy are hired to design them: the latter worked at Fairchild specifically on the design of the Channel F cartridges. Asher and Hardy design a cartridge with a case whose design is influenced by that of the Channel F cartridges.

Atari VCS

As work progresses, Bushnell begins to notice that the development of the console is costing more than expected. Unfortunately, there is not a lot of money in the till, because

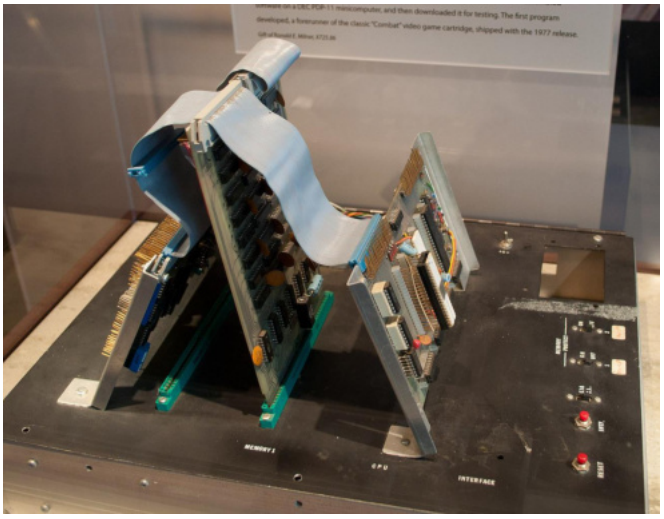


Fig. 4 - one of the early 1975 prototypes of the future VCS/2600 (source: Wikimedia - author: Chris Platsikoudis)

in 1974 Atari almost went bankrupt. This was due in part to the great success of Pong, which led a lot of other companies to saturate the market with the release of numerous clones, causing sales to drop dramatically. Another problem was the release of the arcade game "Gran Trak 10" for sale at a price below the cost of production, burning about $500,000! More money was lost to set up an office in Japan, which was resold shortly after to Namco. In the end, only the acquisition of Kee Games, a front company founded by Bushnell himself and run by a friend of his, set up only to offer Atari games under another brand name, which made blockbuster hits such as "Tank," managed to bring some cash back into Atari's coffers, and save it from bankruptcy. Bushnell tries to find backers but the search is fruitless. He then opens negotiations with Warner Communications, to whom he sells the company in 1976 for $28 million. Warner, seeing the potential of this new video game market that was being created, decides to invest heavily in it: in fact, he infuses some $120 million into Atari's coffers to continue the development of Stella, which is finished in early 1977. However, the official presentation slips to June 4, 1977, because, due to agreements with Magnavox resulting from patent infringement on the Odyssey Tennis cloned with the Pong, Atari has to account to its rival for every game it develops until June 1, 1977: the console is unveiled as the Video Computer System, abbreviated VCS, during the Consumer Electronic Show. Due to problems that arose during the production of the first units, however, marketing does not begin until October: the launch price is $199, and included in the package, in addition to the machine body, are 2 joysticks, 2 paddles and the "Combat" game cartridge. In addition to this 8 other games are put

on the market, mostly conversions of arcade games from Atari or Kee Games.

Success

1977 ends with just under 400,000 units sold, a decent but not excellent number, caused not only by the huge number of handheld electronic games in circulation at the time but also to a marketing that began relatively late. Despite agreements with the Sears store chain, which offered to sell the console in all its stores in exchange for the possibility of offering it under its own name, things did not go well: 1978 closed with about 800,000 units produced but of these only 550,000 reached a gamer's home. In 1979 Atari sells 1 million units, but competition is fierce: along come the Magnavox Odyssey2 (or Philips Videopac depending on markets) and, most importantly, the Mattel Intellivision, which offers superior video and audio features. The Atari VCS does not shine in the quality of its games: to keep production costs down, the technical choices made affect what the console can offer. For this reason, Atari decides to change its marketing strategy: it contracts with the producers of the most popular bar games to "port" their titles exclusively to its console. The first title it secures is the world-famous "Space Invaders," which it introduces in 1980. The path is the right one: once the bar game is over, those who want to play "Space Invaders" also at home have no choice but to buy the Atari VCS. And so sales soar: 2 million consoles were marketed in 1980, doubling the following year to a total of 10 million units sold.

In 1981 other famous games such as "Asteroids" and "Missile Command," conversions of their respective arcades, debuted on the console, selling millions of cartridges each. But 1982 is the best year for the console. Atari deals with the conversion of "Pac-Man" and, with a great marketing strategy, starts a million-dollar advertising campaign long before the game's release, creating a very strong expectation and the rush to buy the console to prepare for the game's release: in that year, 12 million units are sold of the console, and the "Pac-Man" cartridge turns out to be the best-selling game by far, with more than 7 million copies purchased in 1982 alone. This is joined by other successful titles such as conversions of "Defender," "Centipede," "Frogger," but also exclusive titles such as "Yar's Revenge."

Fig. 5 - the English packaging of the Atari 2600: you can see the 2 paddles offered in the package (source: Wikimedia – author: Cristiano Betta)

Atari's economic and commercial strength also succeeds in making inroads into the world of cinema: Atari wins the conversion of Steven Spielberg's famous film "Raiders of the Lost Ark" into a game. On the strength of the good response with this game, Atari retries the operation with another box-office hit film, also by Spielberg, "E.T. the Extraterrestrial," initially enjoying a good commercial response (the title will be sold in more than 1.5 million copies) also thanks to the fame of the film.

The console is also sold in fair numbers abroad. In 1980 it is marketed in Britain (fig. 5), in 1982 in France, in 1983 in Italy, and in 1984 in Germany. The hardware limitations are balanced by the huge game park: despite technologically superior consoles released at that time, for example the 1982 ColecoVision, none can boast the number of games of the VCS. Also in 1982, the heir to the VCS is unveiled: designed to stay on the market for only 3 years, the console's useful life has been extended due to its widespread use but competition is becoming increasingly intense and Atari decides it is time to retire it with the Atari 5200, a console based on Atari's 8-bit computer hardware. It was with the release of the 5200 that the VCS was renamed to the 2600, reprising the code name by which its prototype was initially known, CX2600, before it became Stella.

The crisis of 1983

1983 begins not with the best auspices, record sales begin to decline. The video game market also sees the entry of home computers, which, starting in the early 1980s, begin to compete fiercely with consoles, on the strength of their greater pliability (they can be used for other tasks besides video games) as well as their sometimes superior technical features. The success of the 2600 is then so resounding that many competitors cannot contain

it: Coleco itself, despite its console being technically superior, has to raise the white flag and starts selling both an adapter to be able to run games for its console on Atari's and a system called Gemini that is basically a clone of the VCS. Games for the 2600 came from everywhere, not just Atari: given the console's popularity, everyone wanted to produce titles for it. The first independent developers were some former Atari programmers who left the company in 1979 because they neither felt they were being paid proportionately for the fruits of their labor nor credited as authors of the games they produced: they founded Activision, which began its activities by developing games for the 2600. The titles produced by Activision are highly polished and achieve great success, for example, the aforementioned "Pitfall!", an original game not derived from an arcade, which sells 4 million cartridges. Other manufacturers throw themselves on the 2600 and start churning out games of any genre and, unfortunately, of dubious quality. The market literally becomes saturated and sales begin to plummet. The crisis at Atari begins to be felt, partly because of a couple of titles released the year before, namely "Pac-Man" (fig. 6) and "E.T.": despite the money spent on promotion they do not perform as well as they should. The former pays for the technological inferiority of the console compared to the arcade while the latter pays for the haste in making it to get it out by Christmas. Pac-Man sells just over 7 million cartridges against a forecast of almost double that number while the latter sells only 1.5 against the budgeted 5. Sales of the console are also slow and so, in mid-1983, Atari announces losses of more than $500 million. It is unfortunately not alone, the whole system collapses: it is the 1983 video game crisis that hits North America. Atari is forced to dispose of more than 700,000

Fig. 6 - the hated/loved Pac-Man, box office champion but the same conduit of Atari's crisis (source: Wikimedia - author: The K3nger)

Fig. 7 - Atari cartridges and material found in former Alamogordo landfill: confirmation that urban legend was true (source: Wikimedia - author: taylorhatmaker)

cartridges in a landfill in Alamogordo, New Mexico: over time this event takes on, between denials and confirmations, the features of an urban legend, but excavations conducted in 2014 confirm that Atari really did send a lot of unsold material to the scrap heap (fig. 7). Warner greatly reduced investments and, in early 1984, dismembered the company by selling the home computer and console department to Jack Tramiel, who had left Commodore, to create the Atari Corporation.

After 1984

With negotiations over and the company reorganized, the 2600 is not taken off the market but remains on sale as a low-end gaming system at a price around $40 to $50: after all, there are still hundreds of games in circulation and the console continues to sell. In 1986 the console is revised and given a more compact case, which, despite not being officially affected by a name change, becomes known to all as the 2600 Junior. The Junior continues to receive support from game manufacturers, however: Atari itself continues to support the console, ceasing game production in 1990 and production in 1991. The curtain officially falls on January 1, 1992, when the 2600 no longer appears on the company's lists.

The void left by the 2600 was quickly filled, however. Its fame remained in the hearts of many so the interest in bringing something related to the console back to market was there. Some experiments were seen such as the Atari Classics 10-in-1 TV Game, a replica of the 2600 integrated

into a 2600-style joystick that could be connected to the TV set with 10 of the most famous original games integrated inside. Or the TV Boy, released in the 1990s, a gamepad also connectable to the home TV with a hundred games integrated. More recently, with the resurgence of interest in all things retro, Atari itself (or rather an heir to it) has released since 2004 a series of more or less faithful replicas called Flashbacks, to give modern gamers a taste of the "pixelated" beauty of the games of the original 2600 as well.

The VCS name has been reused for the Atari VCS, a console unveiled in 2021 and sold for now in only a few countries (Australia, New Zealand, the U.S., and Canada), possibly coming to Europe (fig. 8). Despite what the name might suggest, this console has nothing to do with the 2600: it is a system based on a Linux distribution that connects to an online shop from which adapted versions of a selection of games originally developed for the Atari 7800 can be purchased.

Technical characteristics

The console is offered for sale with a low-profile black plastic case, slightly raised at the back where the control switches and cartridge insertion port are housed. The trim is wooden, because the style and taste of the time considered consoles to be objects of furniture so they should fit into the home environment as much as possible. As mentioned earlier, the console was developed around MOS 6507 (fig. 9), a scaled-down version of the better-known 6502 from which it differs by having only 13 addressing lines and by eliminating other pins with functions not used on the 2600. The result is an integrated circuit with only 28 pins, thus more compact and less expensive to produce. The cost to be paid, however, is the inability to handle more than 8 KB of memory because of the reduced address bus.When the console was designed, this limitation was not thought to be limiting because memories were expensive in the 1970s, and from the outset it was planned that the console would not have much of them. Also, the life of the console was reputed to be 3 years at most so memories were expected to drop in price before its successor was developed.

Next to the CPU is the TIA, designed by Jay Miner. This chip mainly handles video and audio signal generation. Picking up on what was said above, due to the cost of RAM, the console was not equipped with a video buffer so the programmer has to supply the graphics chip with data to draw each individual line scan image. This mode of operation was called "race the beam," which could be translated as "chase the beam": for each line, data from the background objects and the various sprites must be passed. Speaking of the latter, the chip supports five: two "player," two "missile," and one "ball." The names sound funny but reflect both what they are used for and the differences they show: the "players" are monochromatic and composed of a horizontal row of 8 bits, although they can be reduced or enlarged; the "missiles" are 1, 2, 4 or 4 pixels wide and are the same color as the corresponding player; the "ball" is a row of 1, 2, 4 or 8 pixels, the same color as the playfield. The latter is called the "playfield" and is a 20-bit wide monochromatic object (where each bit covers 4 pixels on the screen) that overlays the background and covers the left half of one line of the screen, with the possibility of being duplicated or reflected on the other half. Since all objects (sprites and playfields) are only 1 video pixel high, to create 2-dimensional objects the programmers at each line scan of the image must send all the necessary data back to the chip. The TIA handles collisions between sprites through the use of registers, which are also used to manage the color and positions of the various objects. The TIA generates a graphic image of 160x192 pixels. The palette is 128 colors (16 colors for 8 shades) for the NTSC and PAL-M version chip (the system used in Brazil), which drops to 104 colors (13 colors for 8 shades) for the standard PAL system, and reduced to only 8 colors (without different brightness levels) in the case of the SECAM version chip.

The TIA is also responsible for generating the console sound: its capabilities are quite limited, being able to handle only 2 audio channels each with 32 tones and 16 levels of wave management, and a 4-bit volume control.

In support we find a MOS 6532 RIOT, an acronym that stands for RAM-I/O-Timer. This integrated provides what little RAM is available for the console: in fact, it contains 128 bytes that is used by games to store game data such as player points and lives, game variables, and whatnot. In addition to this it offers a programmable timer and 2 bidirectional 8-bit input/output ports, which are used to

Fig. 8 - the Atari VCS of 2021
(source: Wikimedia - author: Wizzard)

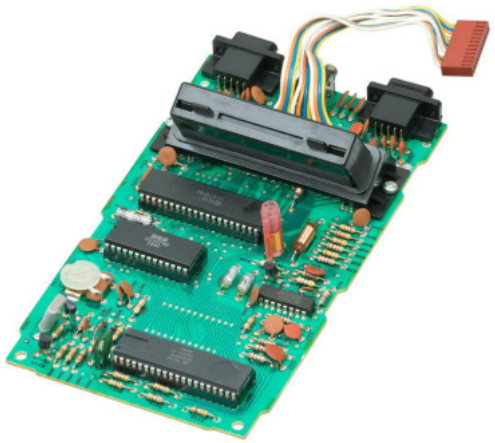


Fig. 9 - the motherboard of the first version of the console. From above, the 3 main chips are: the MOS 6532 RIOT, the MOS 6507 CPU, and the Atari TIA (source: Wikimedia - author: Evan-Amos)

read game controllers connected to the console and status switches. Speaking of the latter, the console somewhat echoes the features of those of the first generation of gaming systems, with some front levers to change some of the console's settings: the first version has 6 levers, respectively for power, choice between color or B&W video output, game difficulty level for the left and right player, game selection in the case of cartridges with multiple games, and hardware reset.

The game controllers supplied with the console are of two types: 2 classic gamepads with rotary encoders, a legacy of the Pong-like games of earlier years, and a more versatile joystick with a single fire button (fig. 10). More complex controllers such as devices designed for driving games also appeared on the market later. The adoption of the "Atari game port," as the connector for connecting the joystick is commonly called, on the Atari 8-bit computers facilitates its widespread use so much so that it becomes a de-facto standard, being adopted by many other systems such as the Commodore VIC-20, C64 and C128 computers, the MSX, and later by the Atari ST and Amiga series. There are also adapters to use them on the Apple II, the TI-99, and the ZX Spectrum.

Game cartridges are small electronic boards placed in a plastic case that must be inserted into a special compartment on the top of the console. To further reduce costs, of the 13 address lines allowed by the CPU, only 12 are carried on the connector so the maximum manageable memory drops to 4 KB. While initially this is not a big problem because the first games reside in only 2 KB of ROM, over time the complexity of the games increases and the graphics, sound, and code grow accordingly with the result that newer games require cartridges larger than 4 KB: in order for the CPU to be able to read all the stored data, bank switching systems are adopted to be able to handle multiple memory chips within the cartridges.

Versions

The first version of the console was made of a particularly heavy plastic which, combined with the weight of the shielding, gives the impression that the case is full even though in reality it is almost completely empty since the circuit board, given the simplicity of the design, is very small. This version, because of its weight and 6 switches, is informally called a "heavy sixer." At the same time, Sears releases the console under its own brand name but calling it "Video Arcade."

To reduce production costs, production was moved to Taiwan in 1978, and the console adopted a less thick plastic, resulting in a lighter weight and being referred to as a "light sixer."

The third version has only 4 switches at the top because the 2 game difficulty selection switches, which are not widely used, have been moved to the rear.

In 1982 the console was renamed the 2600 to resume the number-based nomenclature adopted with the unveiling of its successor, the 5200. This version saw the elimination of the briarwood inserts and the adoption of an all-black plastic case, so among enthusiasts it took the appellation "Vader version," from Darth Vader, the name of the Star Wars (Star Wars) villain, also known in Italy as Darth Vader, and known for his all-black suit.

In 1983 it was introduced in Japan and the name 2800 was adopted here. The console differs greatly from the American version, presenting a much more formal appearance with the switches replaced by as many buttons. The console was not a great success because it was released a year after the Nintendo Famicon (which would shortly thereafter be exported as the Nintendo Enterainment System, NES). After being withdrawn from the Japanese

Fig. 10 - the iconic console joystick (source: Wikimedia - author: Evan-Amos)

Fig. 11 - the Atari 2600 Jr.
(source: Wikimedia - author: Evan-Amos)

market, the 2800 is marketed in the U.S. by Sears as the Video Arcade II.

After its acquisition by Jack Tramiel, the console was revised in 1986 and offered as a low-end economy system: a smaller case in size and with a metal front band was adopted to keep costs down. This version is known as the 2600 Jr. (fig. 11) and takes the appellations "large rainbow" and "short rainbow" depending on the versions, which feature a longer or shorter multicolor band on the metal band.

Games

The strength of the Atari 2600 was its extensive game collection: at the time, no console could boast a catalog of titles like that of the 2600. We are talking about between 500 and 1,000, allowing the console to offer games that meet the tastes of any gamer, and to be a viable alternative to more technologically advanced systems, which weighs in when choosing which console to buy. Indeed, the strength of the 2600 is that it can rely not only on original titles such as "Yar's Revenge," "Adventure," and "Raiders of the Lost Ark," but also and especially on exclusive conversions of the most famous arcade games of the period, such as "Space Invaders," "Asteroids," "Pac-Man," "Defender," "Missile Commando," "Ms. Pac-Man," "Centipede," "Breakout," and "Frogger." Those who want to play these titles at home must necessarily own the Atari console. There is a little bit of everything in Atari's catalog. Even games that are absurd or of dubious morality, such as those produced by a couple of software houses with a purely sexual theme: one can truly speak in this case of the first porn games in history. In short, the gamer has only to choose. And indeed, when the console begins to lose ground to its rivals, Atari pushes the range of titles the 2600 can offer its buyers.

Fig. 12 - E.T. judged by many to be the worst video game ever produced (source: Wikimedia)

However, it is not all gold what Atari releases. As already mentioned, there have been some rather bitter flops. "Pac-Man" was yes sold more than 7 million units but it is estimated that as many as 12 million units were produced, thus resulting in unsold sales of 5 million units! Not to mention the insane expenses incurred in the advertising campaign to promote the game. "E.T." has also been pointed to as one of the games responsible for the Atari crack: judged very poorly by many magazines and industry analysts, it is regarded as the worst video game ever made. Despite its poor quality it still sold 1.5 million units, however, but against unsold sales of about 2.5 million cartridges. To these figures must be added the costs incurred in acquiring the film rights: we are talking about more than $20 million. An outlay that was already considered insane at the time.

Conclusions

The Atari 2600 was a console that marked an era. Its release revolutionized the video game market: its widespread popularity cleared customs of home consoles by making them a common accessory. Its popularity was also the spur that kick-started the independent game developer industry: until its arrival, in fact, games were made exclusively by the manufacturers of the hardware itself. With the 2600, many companies such as Activision began to focus exclusively on making video games. So many video games that the market became saturated, with shoddy titles not competing with each other, to the point where no one was buying anything anymore because everyone now had everything. Despite this, its numbers were incredible even during the crisis: even titles that are considered part of what happened in 1983, such as "Pac-Man" and "E.T. The Extra-terrestrial," still sold millions of copies each.

In the end, the 2600 remained on the market until all of 1991: a full 14 years of honored service, during which developers did not cease churning out games for a console that, despite its technological limitations, became iconic.

iQue - the (un)protections

by Dr. Andrea Q. - www.retrofixer.it

Youtube channel: https://www.youtube.com/channel/UCEw0CQ8LKyA9jVvWXkEwp4Q

This very obscure console was produced starting in 2003 for the Chinese market only through a collaboration of Nintendo with engineer Wei Yen; this half-Chinese, half-American scientist was the principal designer of the graphics chip contained in the Nintendo 64; he was also the founder of ArtX, a company that was contracted by Nintendo to produce the Fipper, processor of the Game Cube. The reason for this union was dictated by the fact that, since 2000, the Chinese market had been "suffering" from a ban on game consoles because they were considered harmful to children's psyches (the ban ended in 2015) so Nintendo needed to get around the problem and be able to get its consoles into China's vast market (here is a plausible explanation of how this was possible: https://www.thegamesmachine.it/speciali/72045/).

Thus, the opportunity came with the iQue products, of which the "Player" represents the progenitor and corresponds to the Chinese version of none other than the Nintendo 64 (in fact, there are also the iQue GBA, GBA SP, GB Micro, the iQue DS, DS Lite, the iQue 3DS)!

This console, whose name in Chinese means "Divine Gaming Machine," is not an ordinary N64 but a version of it "compressed" into a single chip:

All placed inside a controller that connects directly to the TV! From a hardware point of view therefore it is different from an N64

and also has some limitations but the interesting thing is to see how games, some of them translated into Chinese and some even recompiled to solve some well-known glitches, were made available.

These could be downloaded from special machines (called iQue Depot) placed mainly at gas stations (like the kiosks for the Famicom Disk System):

or via PC and dedicated software (which seems to run only under Windows XP) provided that you have first installed the latest firmware version directly from an iQue Depot (this factor makes most iQue's that can be found

in used markets today at risk of obsolescence since, since the termination of the Depots, it is no longer possible to upgrade to the latest firmware and thus use the PC download):

The games, only 14 in total, were downloaded from a service called Fugue Online, which officially ceased service on December 31, 2016 although they were still accessible for direct download for a few years.

To download them one had to enter this address in the browser:
http://cds.idc.ique.com:16963/cds/download?content_id=x

where, instead of the final x, you must enter one of the following numerical values:

```
10000000- likely old firmware
10000001- likely old firmware
10000002- likely old firmware
10000003 - probable latest firmware
1101104 - Super Mario 64
1101902 - SM64 Manual (old version)
1101906 - SM64 (Manual)
1102101 - Yoshi's Story
1102902 - Yoshi's Story manual (old version)
1102904 - Yoshi's Story manual (old version)
1102906 - Yoshi's Story manual
1201105 - Super Smash Bros.
1201901 - SSB (Manual)
2101104 - Ocarina of Time
2101902 - Manual OOT (old)
2101904 - Manual OOT
2102104 - Paper Mario
2102902 - PM manual (old)
2102904 - PM manual
2104108 - Animal Crossing
2105103 - Custom Robo
4101104 - Star Fox (old version)
4101105 - Star Fox
4101902 - Star Fox manual (old version)
4101904 - Star Fox manual
4102103 - Sin&Punishment
4102901 - Manual Sin&Punishment
5101104 - Wave Race
5101902 - manual WR (old)
5101904 - WR Manual
5102108 - Excitebike 64
5102902 - EB64 manual
5201104 - Mario Kart 64(old version)
5201105 - Mario Kart 64
5201902 - MK64 manual(old)
5201906 - MK64 manual
5202103 - F-Zero
5202902 - F-Zero Manual (old)
5202904 - F-Zero Manual
6101104 - Dr.Mario
6101902 - Dr.Mario Manual (old version)
6101904 - Dr.Mario Manual
```

There were also other values that you can find here:
https://gbatemp.net/threads/ique-player-hacking-possibility-with-ique_diag-exe.466906/

To download and install them required a gift card, a kind of ticket, with a code that allowed precisely the transaction. The games are stored in a 64MB memory cartridge that plugs directly into the controller that acts as the console: The protection is precisely in the system by which the

games are encrypted. In fact, a partial study found that games that are downloaded online are already in encrypted form; the PC application (or the Depot) along with the console re-encrypts the game a second time and armors it to the console ID. The system is quite similar to a primordial ticket system later used in the Nintendo Wii, and the online service seemed to be a precursor to Nintendo's future NUS.

On April 24, 2018, after a good 15 years of inviolate security, the hacker group called SUXXORS got the console right and released the first decrypted game, Xingji Huohu (Star Fox), along with its manual also decrypted with an .NFO full of valuable information including Common Key and IV for the AES-128-CBC algorithm used in the console. The exploit used to extract the Common Key and IV was a glitch, presumably hardware.

On May 2, 2018, both OTP and bootROM of the console were dumped ! The former turned out to be a memory of 256 bytes while the latter contains a code of 8Kbs !

The content of the OTP is as follows:

Offset	Size	Description	Note
0x00	0x14	SK Hash	common
0x14	0x10 x 4	ROM Patch	common
0x54	0x20	EccPublicKey	per-console
0x74	0x04	bbId	per-console
0x78	0x40	EccPrivateKey	per-console
0xB8	0x10	bootAppKey - COMMON KEY	common
0xC8	0x10	recryptListKey	per-console
0xD8	0x10	appStateKey	per-console
0xE8	0x10	selfMsgKey	per-console
0xF8	0x04	csumAdjust	per-console
0xFC	0x04	jtagEnable	common

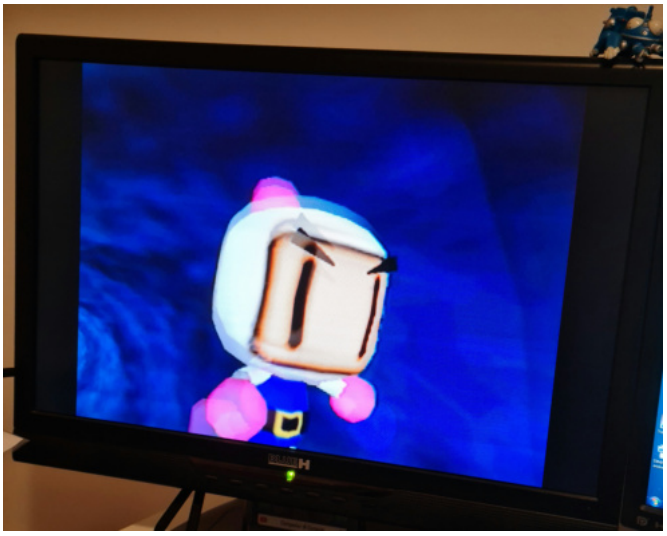
The execution of arbitrary code was made possible by 2 factors:

- the console does not check the contents of the data copied into the memory (specifically game saves)

- ROMs are encrypted with the AES-CBC algorithm which has a vulnerability that allows you to re-encrypt data at will if you already know the plain text (decrypted) data

Basically, having the ROMs decrypted thanks to the SUXXOSRS team, code was inserted at the beginning of a game ROM (it can be done with all of them but the first "target" was the full Dr. Mario game) that jumps the execution of the program directly to the game save that contains arbitrary code. ROM and save are specially modified and preemptively copied via USB prior to execution of the game itself.

With this system, it was possible to add and make full all existing games for the console by editing the ticket.sys file, renaming it to hackit.sys, and having the system reload it (thus a temporary change, not a permanent one, which must be rebooted each time the console is restarted). After careful analysis of both the hardware differences with a real N64 and from the analysis of the information leak, it came up with patches to adapt more than a hundred



N64 games to the console!

This is the procedure to follow to patch an original N64 ROM:

0 - Checklatr in this list whether or not the game is patch proficient (and especially "working" after the patch!)

1 - Find the ROM of the CORRECT REGION you wish to patch [MUST be in .Z64 (NO .n64) format].

2 - patch it using beat patcher software

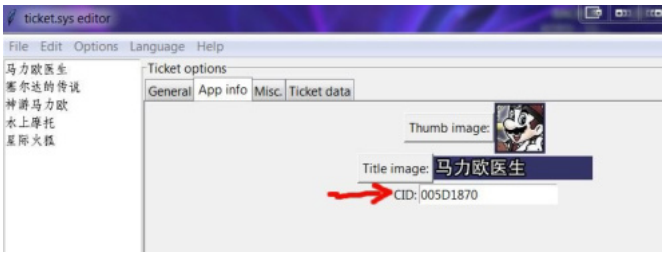
3 - rename the ROM to XXXXXXXX.Z64 (the name must contain ONLY 8 HEX values)

5 - encrypt the file XXXXXXXX.Z64 with the batch tool z64_to_app.bat - the contents of that batch file are:

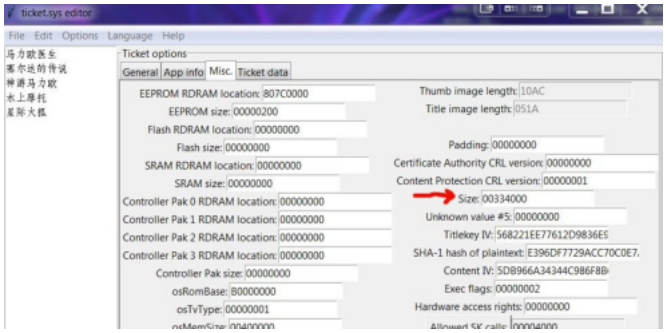
```
@ECHO OFF
SETLOCAL
set file=%1
FOR %%i IN (%file%) DO (
SET cid=%%~ni)
iquecrypt.exe encrypt -app %file% -key
00000000000000000000000000000000 -iv
00000000000000000000000000000000
rename "[enc]%cid%.z64" "%cid%.app"
```

6 - if the batch file had not done so, rename the file to XXXXXXXX.app

7 - edit hackit.sys with "ticket_sys_editor.exe" as follows:



- add a new ticket entry using Edit -> new ticket (max 48 titles otherwise the console may behave strangely);



- In "App Info" change the CID to the same name as the XXXXXXXX file;

- in "Misc." enter the file size value (number of bytes converted to Hex value: e.g. 12,582,912Bytes = 00C00000) in the right column ("Size", sixth value from the top - corresponds to the file size in bytes)

8 - File -> Save

9 - copy the .app and hackit.sys files to the flash cart through the ique_diag_extended tool (command: " 4 cid.app " and "4 hackit.sys")

Raise your hand if any of you were aware of this rare retrovideoludic gem.

WARNING: Disclaimer

The information contained in this article is for informational purposes only. This documentation is not guaranteed to be error-free. If this information is used to modify your hardware, it is your responsibility to take all necessary emergency, backup, redundancy, and other measures to ensure its safe use. RetroMagazine World disclaims all liability for any damages caused by the use of the information in this article.

Grundy New Brain, the renegade Sinclair

by Alberto Apostolo

Sinclair Radionics to Thurlby Thandar Instruments.

In 1975, Sinclair Radionics (a company founded by Clive Sinclair in 1961) was having financial problems. To solve them, in 1976 Clive Sinclair availed himself of public capital from the NEB (National Enterprise Board) in exchange for partial control over Sinclair Radionics. In 1978, the NEB agreed to fund the development of a personal computer (although that same year it was funding Inmos to develop a new microprocessor architecture called the Transputer). The previous year, machines such as the Apple II and Commodore PET had been very successful, and great confidence was placed in Clive Sinclair to promote the micro revolution in the UK (in view of his willingness to produce technological devices for ordinary people).

The proposed computer hardware would be designed by Mike Wakefield and the software by Basil Smith. Having gotten the go-ahead, they began to work on the project in earnest. Meanwhile, Clive Sinclair was setting up Science Of Cambridge (which later became Sinclair Research Ltd) in order to have more freedom of action. In addition, Clive Sinclair realized that that computer would cost customers more than the £100 they had planned.

In July 1979, Clive Sinclair left Sinclair Radionics to devote himself entirely to Science Of Cambridge, which was producing the MK14 system and designing what would be the ZX80. A few months after Clive Sinclair left, the NEB sold the TV and calculator business units of Sinclair Radionics. In September 1979, the board decided to change the company name to Sinclair Electronics to give itself a more modern image (and perhaps to snub Clive Sinclair). But the vicissitudes were not over. In January 1980, it changed its name again to Thandar Electronics, and after the change of government (from Labour to Conservative) it was sold to Thurlby Electronics. The merger gave birth to TTi (Thurlby Thandar Instruments),

NewBrain
The NewBrain is a Personal Computer designed for business, professional, scientific and technical use, for educational purposes and for the home.
All these areas demand a reliable, cost-effective computer built to a high specification and with the ability to expand easily. NewBrain meets these requirements handsomely, offering the following comprehensive specification.
NewBrain
HARDWARE
The Powerful Z80A
32K Random Access Memory (RAM)
29K Read Only Memory (ROM)
Keyboard
Built-in Display (Model AD)
Dual Cassette Ports
tape recorders. Full motor drive control is provided. Data is transferred at 1200 baud.
TV Output
Video Output
Communications
Expansion Connector
NewBrain
SOFTWARE
NewBrain
EXPANSION
ROM Buffer Expansion Module
Memory Expansion Modules
Multiple Communications (Network) Modules
Tape output level controls
Dual cassette interface connectors
RS232/V24 interface connector
Composite video connector
TV connector for domestic TV sets
Expansion connector
RS232/V24 printer interface connector
Power connector
Hardwearing ABS case
Control key
Shift key
Repeat key
Graphics key
Video text key
Cursor control keys
YOUR COMPUTER
NewBrain

Fig. 1

which still produces electronic test and measurement instruments in Huntingdon (Cambridgeshire, UK).

From Newbury to Grundy

The NEB also had a stake in Newbury Labs (after a bid made in 1977). This stake was sold in 1978 to the Data Recording instrument Company (while retaining oversight). Implementation of Wakefield and Smith's project (now called NewBrain) passed to Newbury. By early 1980, Newbury was ready to show three prototypes, named M, MB and MBS, and discuss the product in public. Dick Pountain, of Personal Computer World magazine, was impressed, stating that the design was significantly ahead of what had been seen for portable computing [Smi21]. The MB prototype was a compact machine with its own display and integrated battery. The MBS prototype would have used low-power components to maximize battery life. Newbury advertised the three units in the trade press throughout 1980.

Oddly enough, the NewBrain was not commercialized in 1980, probably a victim of the changes taking place at Newbury. With an anti-nationalization government in power, the NEB's prerogatives were downsized (in 1981, the NEB itself was privatized and merged with the National Research Development Corporation to form the British Technology Group, BTG). During this period, Newbury's CEO (Bob Smith) left the company to move to Grundy. In September 1981, Newbury Labs formally sold the NewBrain to the (newly formed) Grundy Business System. Designers Mike Wakefield and Basil Smith were hired by Grundy. It might have seemed like a sell-off, but the sale of NewBrain combined with a 235000 pound investment yielded a 30 percent stake in Grundy Business Systems.

Missed opportunities and broken promises

The delay in market launch was the cause of a number of missed opportunities. The most important was that the British state broadcaster BBC chose Acorn-produced models for its "Hands on Micros" broadcast (although it is said that it initially intended to adopt the NewBrain). Unlike Grundy, Newbury probably did not have the capabilities to complete and market the NewBrain. Finally, the NewBrain was launched by Grundy in July 1982 (fig 1). Two models were offered: the 233-pound Model A (fig 2) and the 267-pound Model AD (fig 3). Model A had 32KB of Ram, a Zilog Z80A processor clocked at 4MHz and ports for a dedicated printer, communications and two

Fig.2

Fig.3

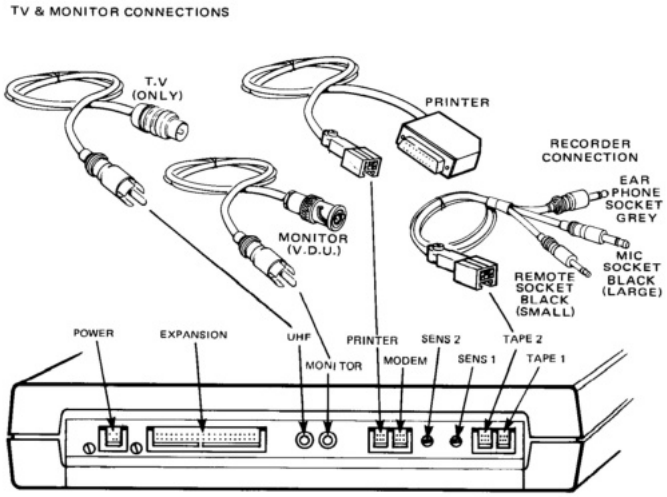


Fig.4

tape recorder connections, as well as monitor and TV (fig. 4). An expansion port on the back could accommodate 64KB, 128KB, 256KB or 512KB Ram packs. Ram packs had pass-through connectors that allowed up to 2MB of memory to be added, far more than competing machines could offer. No sound effects were provided, and graphics were virtually monochrome (fig.5). The AD model came with a 16-character VFD (Vacuum Fluorescent Display, fig.6) display (with 14 segments) and could mount the optional battery (long promised). NewBrain came with a BASIC compiler to translate software into machine code at once (instead of an interpreter). It was not a machine

Fig.5

for beginners. An experienced user could have exploited it for applications available on more expensive machines. A version of the CP/M operating system was supposed to be out by January 1983 (but instead customers had to wait many months). There were problems with the ports for cassette recorders. Other peripherals (such as floppy-disk and hard-disk controllers, expansion modules, and a special multi-module housing) were launched much later than announced, if they ever arrived at all (fig.7).

After a slow first phase of sales, public interest increased at Christmas 1982 with more requests than Grundy expected. In early 1983 it was decided to increase production tenfold but (due to delays in the release of promised peripherals) demand then collapsed. Basil Smith and Mike Wakefield, who had worked on the NewBrain from the beginning, quit at that time. Their connection with the machine was so close and their knowledge so deep that it would have been difficult for their remaining colleagues to continue the project. Thus the Grundy Business System headed for closure in the later months of 1983. An estimated 50000 NewBrains had been sold. The stock in the warehouse came to the Dutch company Tradecom, which installed them in schools in the Netherlands.

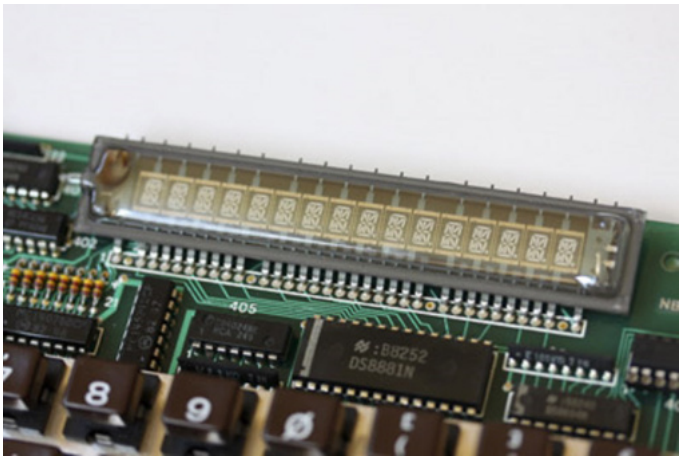


Fig.6

Fig.7

Conclusions

Perhaps the architecture thought up by Wakefield and Smith was a little too complicated for others to easily work on the design to make changes and improvements. The lack of colors and sound effects was a very serious limitation for the production of games and software in

DATA SHEET

System on a chip	: Keyboard and one-line VF display chip: COP420 MCU
CPU	: 8 bit Zilog Z80A, 4 MHz
Memory	: 32 kB RAM (Maximum 2 MB), 24 kB ROM
Display Text modes	: 32x25, 32x30, 40x25, 40x30, 64x25, 64x30, 80x25, 80x30
Graphics	: Composite video, UHF TV output
Graphics modes	: 256x256, 320x256, 512x256, 640x256
Total number of colours	: 2
Keyboard	: 62 keys
I/O Ports	: 2xTape recorder(1200 Baud),Expansion,2xRS-232 (to 19000 Baud)

general. The vicissitudes of the companies involved in the realization of the project caused delays in putting the computer and very important accessories into production, discouraging the public who (despite the interest shown) then turned their attention to models of other brands available immediately in large quantities. It could have been a Sinclair computer but it was not, affecting the evolution of computers envisioned by Clive Sinclair.

In Italy we say that "History is not made with ifs and buts" in the sense that you cannot change the course of past events by making assumptions. However, I tried to make a little joke with Paint to see what a Sinclair "ZX NewBrain" would look like, perhaps provided with colors and sounds (fig.8).

Fig.8 - It's only a joke...

Useful links

New Brain enthusiast site with documentation and emulators featured in the Downloads section
https://newbrainemu.eu/

The user's manual (very similar aesthetically to the Sinclair ZX manual).
http://biblioteca.museo8bits.es/newbrain/NewBrain_Handbook.pdf

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[Wik22] https://en.wikipedia.org/wiki/Grundy_NewBrain [consulted on 2022-08-10]

Commodore 64 PLA for dummies

An affordable guide to the PLA of the Commodore 64 and its dump

by Salvo Cristaldi

Many of us, during the lockdown period due to COVID-19, dusted off old projects to take advantage of the large amount of time spent at home. In my case it was homebrew (homemade software) on the PS3 and mainly emulators, including VICE. From the emulator to the dear old Commodore 64, friend of a thousand adventures in my youth, then, the step was short.

Purchased without guarantee of operation a nice "cookie," as the first version of the C64 is lovingly called, discovered that it would not turn on.

Having eliminated the trivial things like power supply, fuse, and voltage regulator, the problem was definitely a component of the motherboard.

Among the various hardware components of which the Commodore 64 is composed, there is one famous for its fragility, which is the cause of most of the machine's

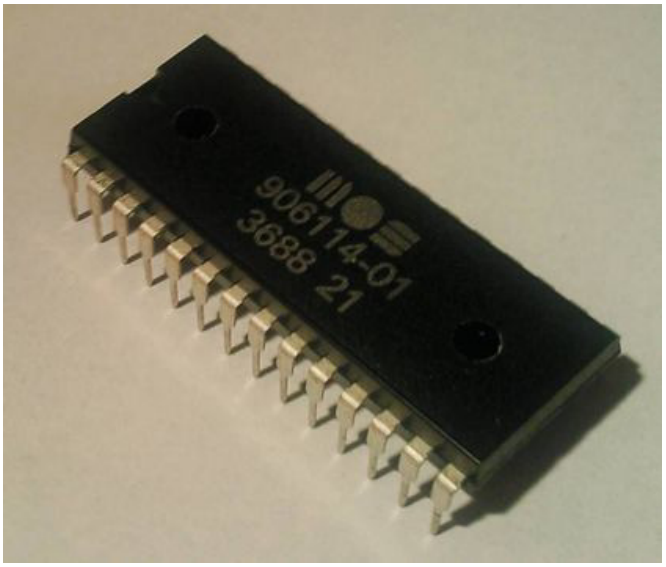


Fig. 1 - Source c64-wiki.com

failures: the PLA chip, codenamed MOS 906114-01.

This guide is intended to explain what the PLA is in the Commodore 64, and then, in a second part, to see how to make a backup (dump) of the chip for possible replacement in a simple and inexpensive form.

The PLA is part of the Programmable Logic Array family. This type of device is used to have a complex set of logic gates to form a well-determined logic function.

In digital electronics, the basic logic gates are the AND and OR gates. They have two or more inputs and one output. In the AND port the output has "high" value, commonly called 1, if all inputs have value 1, otherwise 0 ("low" value). In the OR port the output has value 1 if at least one of the inputs has value 1.

By cascading multiple logic gates, one can have complex logic functions, with multiple inputs and multiple outputs. Each different combination of the inputs will always have the same output value. PLAs are precisely used to have complex logic gate systems in a single chip.

In the Commodore 64, the PLA chip is used as a decoder, to produce selection signals for chips connected to it, plus other control signals. Many chips within the C64

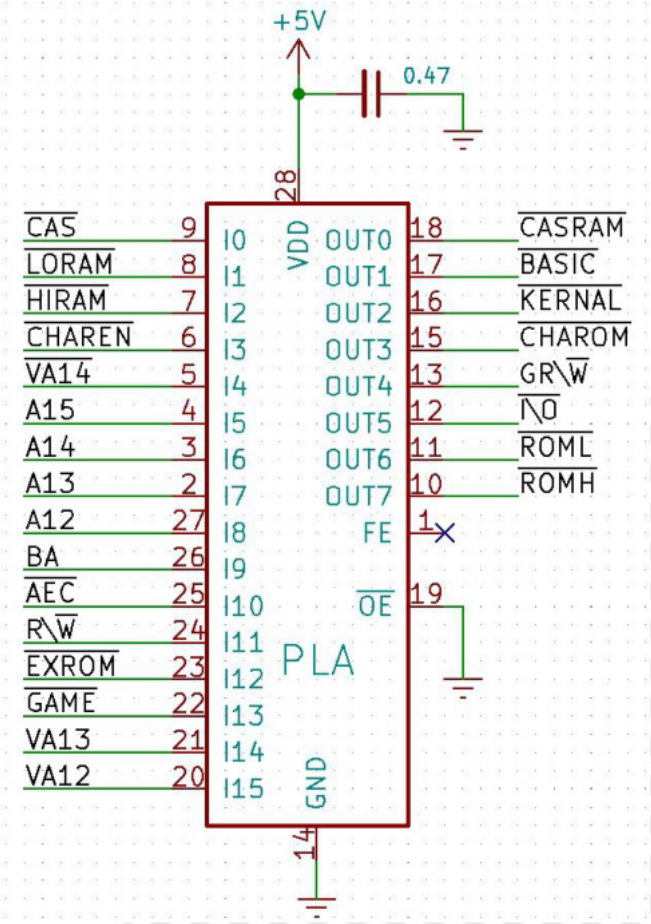


Fig. 2

remain inactive as long as a value 1 is present on the respective chip select pin, called CS, and will be activated by the appearance of a value 0. For example, the BASIC, Kernal and character ROMs have their respective CS pins connected to the PLA outputs, pins 17, 16 and 15 (Figure 2). From pin 18 comes out the CASRAM signal used to enable dynamic RAM during addressing and arrives on pin 15 of each of the eight RAM chips, from pin 13 comes out the GR\W signal that enables the chip from color RAM, from pin 12 comes out the I\O signal that enables one of the two parts of the 74LS139 decoding chip, and from pins 11 and 10 come out the ROML and ROMH signals that are used to enable the ROMs (lower memory $8000-$9FFF and upper memory $A000-$BFFF) in any cartridge inserted in the expansion port, respectively.

All this makes it clear how essential the PLA chip is in the Commodore 64. Being also a very delicate chip, in case of failure it is very complicated to find a replacement for it. Obviously, it has not existed commercially for decades except second-hand on Ebay or Chinese electronics sites where it is easy to find replacement parts from computers that have been dismembered to sell their components.

Fortunately, even today there is a large group, including myself, of die-hard enthusiasts who continue to use these computer "grannies," and among them are those who design and make modern devices to replace their discontinued components. Indeed, there are a variety of "Modern replacements" to replace the ROMs, the SID, the DRAMs, the VIC II, the CPU, other custom chips from MOS Technology found inside the Commodore 64, as well as the PLA chip itself. Maybe not all of them are perfect functional clones of the original chips, but just be well informed before acquiring one.

Let us return to the discussion of what the PLA is, focusing on its view as a black-box that receives an input formed by 16 inputs and provides an output formed by 8 outputs. Each different input value corresponds to an output value respectively that is always the same. Doesn't this remind you of anything? A (read-only) memory with a 16-bit address bus and an 8-bit data bus. Trivially a ROM (an EPROM, a FLASH, etc etc). In fact, the PLA was considered by some to be one of the Commodore 64's ROMs, but much more expensive and faster than a regular ROM.

It must be said that in a ROM with a 16-bit address bus, all 65536 (216) memory locations are addressable, readable, and their contents do not vary over time. In the PLA not all the different combinations of signals can be presented as inputs because some of them do not correspond to real situations that can be accessed during machine operation, it follows that the set of all outputs defined by the functional specification is a sub-set of the obtainable totality.

Through this premise we can understand why the first modern substitutes for PLA were EPROMs, appropriately loaded with the corresponding content of the original, obtained either by reverse engineering the chip or by reading it as if it were a memory. On the net it is easy to find the BIN (binary) file to create a homemade PLA via an EPROM (usually a 27C512), but having the exact content to emulate the PLA chip inside an EPROM is not enough since the exact behavior is also dictated by the response time of the EPROM, which must be neither too slow nor too fast.

This is because the PLA is a sort of signal sorter that has certain cadences measured by the clock. As well documented

Fig. 3

Fig. 4

in the article "The C64 PLA Dissected" [by Thomas 'skoe' Giesel, http://skoe.de/docs/c64-dissected/pla/] par. 3.3, ".... The PLA propagation delay is very important for the proper operation of the C64. For example, the CASRAM signal must be delayed by the PLA by at least a certain amount of time. On the other hand, the propagation delay must not be too large, otherwise, for example, the setup times of the chips, which receive their enable signal too late, may not be met. .....".

Both in the previously mentioned document and during the conference "The PLAin truth about the C64 PLA - World of Commodore 2017" [Toronto, Dec. 9-10, 2017 - https://www.youtube.com/watch?v=ofg33zk9uCA&t=350s] there is express reference to a very specific EPROM that perfectly meets the necessary timelines: the M27C512-90B6 from ST Microelectronics. It is an OTP (One Time Programmable) EPROM, meaning it can be programmed only once, and finding a new one to program is difficult as it has been out of production since 2011. But the UV-erasable and reprogrammable version, the M27C512-90F6 (Figure 3), is easy to find commercially, even at low cost (€1 or €2 a piece).

Wanting to create an inexpensive PLA replacement with an M27C512-90F6 EPROM, it is not enough to program it with the appropriate BIN file, but an adapter must be created to respect the position of its pins, which is slightly different from that of the original PLA. By modifying one or two connection sockets stacked together, one can easily create the adapter in question. Even better, you can use an adapter on a ready-made integrated circuit to house the EPROM (Figure 4). It is usually found as an Assembly Kit, where you only need to solder the pins and the connection socket.

Doing the connection interfacing yourself is certainly more fun, but the end result of the modified socket, full of additional wires and various soldering is quite ugly to look at. Despite then being inside the machine, the feeling of having done an unpleasant thing remains. At this point, if you want to do a neat little job yourself, you pick up a CAD program for creating printed circuit boards, in my case the open source software Kicad, and knock out the mini project.

Having in front of you the schematic of the PLA pins and that of a 27C512 (in this case the brand is not important since the type of EPROM is always the same), you first make the logical diagram of the connections and then move on to the actual 2D drawing of the printed circuit board (PCB). The final result is exported in the format that the person doing the printing (PCB production) wants. Commonly this is the file format called Gerber.

This whole process sounds complex and very expensive, however, using software like Kicad is really simple, and as far as PCB printing is concerned, there are (Chinese) sites that for a handful of Euros will print your design in no less than 5 pieces and ship it to your home via courier. Then the cost of delivery depends on how long you want to wait. The final quality of the PCBs is more than excellent.

Having acquired the adapter that acts as the connection interface, using a very ordinary EPROM programmer, you write the contents inside the chip, insert the EPROM into the adapter, and then put it on the C64 motherboard.

But where does one retrieve the content to be written into the EPROM? The easy answer would be--just ask Mr. Google, but those who follow the DIY (Do It Yourself)

Fig. 5

philosophy would answer differently. If you have a working C64, the contents of the PLA are available to you, just read the original chip as if it were an EPROM of the same type as the one you want to use as a replacement. Just take the adapter and mount it backwards. The pins that would go underneath are in this case reversed with the upper ones, i.e., the socket housing and vice versa (Figure 5). You insert the PLA into the socket, and the whole thing gets read by the EPROM programmer, which in addition to writing, reads and verifies the chip contents.

Once read, you save the BIN file for future use. In this way you have made a nice backup (dump) of the contents of your PLA.

The EPROM programmer, through its software, is useful not only for reading and writing the contents of writable memory chips, but also for testing chips with logic gates, such as the 74LS family of integrated circuits, to verify their operation. Many of these software programs allow you to recognize and test uncommon integrated circuits, just by importing the correctly described specifications into a special file. One such file exists on the net so that the operation of the C64 PLA can be verified. As shown in Fig. 6, the operation of the PLA replacement was tested via EPROM, with positive results (Figure 6).

It should be emphasized that this type of test is a necessary but not sufficient condition to decree EPROM as a 100% functional replacement for PLA, since response times are not taken into account. It will be your Commodore 64, after intensive testing, that will give you the final answer. If anyone was wondering then if the breadbin bought as not working had a broken PLA... yes, but it also had the defunct CPU (6510), which is quite rare.

User-82S100 PLA (C64) Import

NEW DELETE EDIT COPY

Result	LINE	1	2	3	4	5	6	7	8
Normal	0017	X	0	1	1	X	0	1	X
Normal	0018	X	1	1	1	X	X	1	X
Normal	0019	X	1	1	1	X	X	1	X
Normal	0020	X	1	0	1	X	X	1	1
Normal	0021	X	X	X	X	X	X	X	X
Normal	0022	X	X	1	0	X	X	X	X
Normal	0023	X	1	0	X	X	X	X	X
Normal	0024	X	0	0	0	X	X	X	X
Normal	0025	X	0	1	1	X	X	X	X
Normal	0026	X	X	X	X	X	X	X	X
All Vector Testing Normal									

Vector Table and Test Result TEST Auto Find BACK

Fig. 6

Susi strikes again (for C64 and beginners)

by Eugenio Rapella

On the latest "Puzzle Week" appears a new "Susi's Query," the 988th. A friend of Susi's, let's call him Francesco, had to face a test consisting of 100 questions, of the "True" or "False" type, numbered from 1 to 100. When the test is over, we learn that the correct solution is: "True" for questions with a multiple number of 4, "False" for the remaining ones. Francesco marked "False" for all questions with a multiple number of 3, "True" for all others.
How many correct answers did Francesco in total?

If "x" is the number of a question, the answer is correct for Francesco if
(a) x is multiple of 4 (so the correct answer is V) and x is not multiple of 3 (so Francesco marked V)
or
(b) x is not a multiple of 4 (so the correct solution is F) and x is a multiple of 3 (in which case Francesco scored F).

At this point, our trusty C64 is able to solve the question with a handful of instructions in Basic. Here it is:

```
10 for x=1 to 100
20 m4=0:m3=0
30 if(int(x/4)*4=x)then m4=1
40 if(int(x/3)*3=x)then m3=1
50 if((m4=1)and(m3=0))then e=e+1
60 if((m4=0)and(m3=1))then e=e+1
70 next
80 print" the number of correct answers is ";e
```

In the "for-next" loop, "x" represents the question number; the variable m4 is worth 0 if x is not a multiple of 4, it is worth 1 otherwise; similarly m3 is worth 0 if x is not a multiple of 3, it is worth 1 if it is.
How can our C64 recognize whether or not x is a multiple of 4 without resorting to the "modulo" function (which, alas, is not part of its cultural background)? Our Commodore is not frightened: if x is a multiple of 4, dividing x by 4 yields an integer. The integer part (int(..)) of this value is the value itself, which, when multiplied by 4, comes back to give the starting x (e.g., if x=20, you have 20/4 = 5; int(5) is 5 and 5*4 gives 20 again). Ultimately, if x is a multiple of 4 the condition in instr. 30 is true is m4 is raised to 1.

If, on the other hand, x is not a multiple of 4, x/4 is not an integer and in int(x/4) the decimal digits of the quotient are "eliminated" so that int(x/4)*4 does not return the initial x (e.g., if x=19, you have 19/4=4.75; int(4,75)=4 and 4*4=16 other than 19). In this case m4 remains 0 as it was initialized at instruction 20.
This is repeated for the value 3 in instr. 40: m3 will be worth one if x is a multiple of 3, zero in opposite pot.
At 50 the C64 checks if situation (a) has occurred, at 60 if situation (b) has occurred; in these cases, the total of responses (variable "e," initially null) is incremented. When the cycle is complete, "e" will contain the score totaled by Francis, which is printed at 80. And bravo to our Commodore 64!

Will "Puzzle Week" readers who cannot rely on the C64 (their loss!) have been able to solve the Query?
Here is one possible solution:
the lowest common multiple between 3 and 4 is 12. Here is the situation of the first 12 questions:

Numero domanda:	1	2	3	4	5	6	7	8	9	10	11	12
Soluzione corretta:	F	F	**F**	**V**	F	**F**	F	**V**	**F**	F	F	V
Risp.di Francesco:	V	V	**F**	**V**	V	**F**	V	**V**	**F**	V	V	F

In the first dozen the correct solution coincides with Francis' answer in 5 cases (questions 3,4,6,8,9). Beginning with question 13 this pattern is repeated identically for the subsequent dozen; since 100/12 = 8.33.. there are 5 correct answers for each of the eight dozen for a total of 5*8 points. This leads to the first 12*8=96 questions; for the last four the pattern above applies in relation to questions 1, 2, 3, 4.

Thus, Francesco total score is 5*8+2= 42 in accordance with what the Commodore calculated.

"Forty-two out of a hundred" - I have my doubts that Francesco passed the test.

Code optimization in MSX BASIC

by Germán Gómez Herrera - Systems Engineer - Spain

It is known that interpreted languages such as basic are limited according to the speed performance.
To overcome this matter, there are some inventive ideas to write a program in basic with a better running speed.

For example: To use integer variables, the main loop should be at the beginning of the program and so on.(1)

But even so, the running speed of the program can be too slow due to the use of functions such as trigonometric functions.
In this regard, when a program call to a function, to get a value, the interpreter has to do some tasks which spend time.
It would be more suitable that the value was precalculated. This spend space in memory but increase the performance speed.

The next lines show some tests and a game written in MSX Basic (2) in order to clear up this issue.
All the examples are included in the autoexecutable disk image which is attached.
Let's go to see an example with the sine function in a test and to check the time spent.
Firstly, the program which use the sine function:
If you run the program, you will see the program draws a sequence of points showing a kind of wave trajectory.
The running of the program lasts more than 25 seconds. Therefore, this is not acceptable for some critical cases such as games or others.

Let's go to get better it.

Next test: we are going to change the sine function to precalculated values.

First of all, the different values, which need the program, have been precalculated and saved them in a vector.
The running of the program lasts around 2 seconds. This way is more suitable than the last one. You can see the diferences in the figure 1.

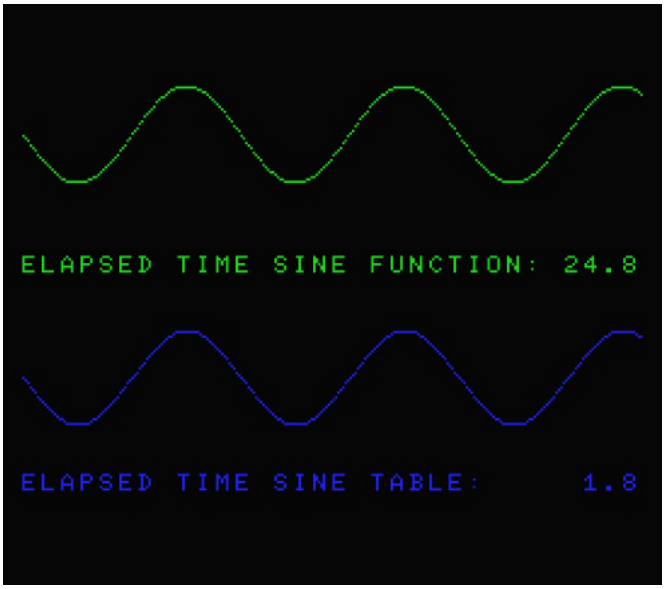


Fig. 1 - MSX Basic (computed and pre-computed)

Now, let's go to see a proof with the sine function and other things in a game.
The program is a kind of space game. You can imagine: An enemy space ship is moving in a kind of wave trajectory. Besides, it is able to shoot.
On the other hand, there is another space ship which is driven by cursor keys. And it can shoot as well using the space bar.
As to optimize the running speed of the program, the following points have been applied so that the game can be playable:

- Integer variables applied.
- The main loop is at the beginning of the program.
- Of course, sine function values are precalculated.
- Movement about cursor keys are precalculated as well.
- And something more such as handling the video memory.

The result is the following (see figure 2):

Fig. 2 - The game from the listing enclosed

And the full code is showed in list 1:

```
10 CLEAR 200,&HC000:DEFINE-Z:GOSUB 500:GOSUB
450:GOSUB 110
20 D=STICK(0):IF D>0 THEN
AX=DX(D):AY=DY(D):X=X+AX:X=X+AX*(X<0 OR
X>240):Y=Y+AY:Y=Y+AY*(Y<8 OR Y>170):VPOKE
&H1B00,Y:VPOKE &H1B01,X
30 IF STRIG(0) AND FF=0 THEN XF=X+16:YF=Y:FF=1
40 IF FF THEN XF=XF+8:PUT SPRITE 2,(XF,YF),
15,3:IF XF>255 THEN PUT SPRITE 2,(0,0),
0,5:FF=0:XF=0:YF=0
50 XE=XE-PE:IF XE<0 THEN GOSUB 110
60 YE=YT+TS(XE MOD 90):VPOKE &H1B04,YE:VPOKE
&H1B05,XE
70 IF FE THEN XQ=XQ-PQ:YQ=YQ-2*((YQ<Y)-
(YQ>Y)):PUT SPRITE 3,(XQ,YQ),15,4:IF XQ<0
THEN FE=0:VPOKE &H1B0E,20 ELSE ELSE IF XE>X
THEN XQ=XE-16:YQ=YE:FE=1
80 IF GM THEN 20
90 GOSUB 300
100 GOTO 20
110 SE=(RND(1)*2)+1:XE=255
120 IF INT(RND(1)*2) THEN YT=(RND(1)*120)
ELSE YT=Y:IF YT>120 THEN YT=120
130 YT=YT+20
140 YE=YT+TS(XE MOD 90)
150 CL=(RND(1)*14)+2
160 CE=CE+1:IF CE>5 THEN CE=1:PE=PE+1:PQ=PQ+1
170 PUT SPRITE 1,(XE,YE),CL,SE
180 RETURN
190 SPRITE OFF
200 IF ABS(XF-XE)<17 AND ABS(YF-YE)<17 THEN
GOSUB 230 ELSEIF ABS(X-XE)<17 AND ABS(Y-
YE)<17 THEN GOSUB 400 ELSEIF ABS(X-XQ)<17
AND ABS(Y-YQ)<17 THEN GOSUB 400 ELSESPRITE
ON:RETURN
210 SPRITE ON
220 RETURN 80
230 PUT SPRITE 2,(0,0),0,5:FF=0:XF=0:YF=0
240 FOR I=0 TO 15:PUT SPRITE 1,(XE,YE),I,SE:FOR
K=0 TO 50:NEXT:NEXT
250 GOSUB 110
260  SC!=SC!+CE*100+PE*500:GOSUB  270:RETURN
270 S$=MID$(STR$(SC!),2):S$=STRING$(6-
LEN(S$),  "0")+S$:P=&H1808:GOSUB  290:RETURN
280 S$=MID$(STR$(HI!),2):S$=STRING$(6-
LEN(S$),  "0")+S$:P=&H1818:GOSUB  290:RETURN
290 FOR I=1 TO 6:VPOKE P,VAL(MID$(S$,I,
1)):P=P+1:NEXT:RETURN
300 GOSUB 490
310 FF=0:LINE(96,88)-(159,95),1,BF
320 RESTORE 760
330 D=11*256+96:FOR I=D TO D+63:READ N:VPOKE
I,N:NEXT
340 D=&H2000+11*256+96:FOR I=D TO D+63:VPOKE
I,&H41:NEXT
350 A$=INKEY$:IF A$<>"" THEN 350
360 A$=INKEY$:IF A$<>" " THEN 360
370 IF SC!>HI! THEN HI!=SC!
380 LINE(96,88)-(159,95),1,BF:GOSUB 450:GOSUB
110
390 RETURN
400 PUT SPRITE 1,(0,0),0,5
410 PUT SPRITE 2,(0,0),0,5:FF=0
420 PUT SPRITE 3,(0,0),0,5:FE=0
430 FOR I=0 TO 15:PUT SPRITE 0,(X,Y),I,0:FOR
```

```
K=0 TO 200:NEXT:NEXT
440 GM=0:RETURN
450 GOSUB 490
460 X=0:Y=90:PUT SPRITE 0,(X,Y),
15,0:GM=1:CE=1:PE=1:SC!=0:FE=0:PQ=4
470 GOSUB 270:GOSUB 280
480 RETURN
490 FOR I=0 TO 4:PUT SPRITE I,(0,0),
0,5:NEXT:RETURN
500 KEYOFF:COLOR 4,1,1:SCREEN 1,2,0:DIM
TS(90),DX(8),DY(8):ST=16
510 ON SPRITE GOSUB 190:SPRITE ON
520 PRINT "LOADING":PRINT:PRINT "SPRITE
PATTERN ";
530 FOR I=0 TO 4:FOR K=1 TO 32:READ N:A$=A$
+CHR$(N):NEXT:SPRITE$(I)=A$:A$="":PRINT
"*";:NEXT
540 PRINT:PRINT "VECTOR TABLE ";
550 FOR I=0 TO 89:READ N:TS(I)=N:NEXT:PRINT
"*";
560 FOR I=0 TO 8:READ N:DX(I)=N:NEXT:PRINT "*";
570 FOR I=0 TO 8:READ N:DY(I)=N:NEXT:PRINT "*"
580 SCREEN 2:FOR I=0 TO 31:VPOKE &H1800+I,
31:NEXT
590 P=0:FOR I=384 TO
463:D=PEEK(&H1BBF+I):VPOKE P,D OR D/2:VPOKE
&H2000+P,&H41:P=P+1:NEXT
600 A$="HISCORE":FOR K=1 TO LEN(A$):Q=ASC(MID$
(A$,K,1))*8:FOR I=Q TO
Q+7:D=PEEK(&H1BBF+I):VPOKE P,D OR D/2:VPOKE
&H2000+P,&H41:P=P+1:NEXT:NEXT
610 FOR I=0 TO 31:READ N:VPOKE &H1800+I,N:NEXT
620 FOR I=0 TO 255 STEP 4:PSET(I,RND(1)*180+10),
(RND(1)*13)+2:NEXT
630 RETURN
640 DATA
255,18,127,254,84,3,118,187,0,186,212,110,31,
47,18,15,180,128,0,0,0,240,12,115,129,126,216
,0,0,0,0,180
650 DATA
15,62,236,214,1,6,3,5,0,3,5,0,235,210,44,11,2
24,212,107,212,0,0,192,96,0,160,96,0,92,235,8
4,160
660 DATA
3,12,19,44,80,80,160,160,160,193,98,81,63,21,
14,3,192,48,216,12,6,10,49,90,181,107,176,218
,140,216,176,64
670 DATA
0,0,0,0,0,0,0,183,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0
680 DATA
0,0,0,0,0,0,0,237,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0
690 DATA
0,1,2,4,5,6,8,9,10,11,12,13,14,15,16,17,17,18
,19,19,19,19,19,19,19,19,19,19
700 DATE
18,17,16,15,14,13,12,11,10,9,8,6,5,4,2,1,0
710  DATA  -1,-2,-4,-5,-6,-8,-9,-10,-11,-12,-
13,-14,-15,-16,-17,-17,-18,-19,-19,-19,-
19,-19,-19,-19,-19,-19,-19
720  DATA  -18,-17,-17,-16,-15,-14,-13,-12,-
11,-10,-9,-8,-6,-5,-4,-2,-1
730 DATE 0, 0, 4, 4, 4, 0,-4,-4,-4
740 DATE 0,-4,-4, 0, 4, 4, 4, 0,-4
750 DATA
31,31,12,13,14,15,16,31,0,0,0,0,0,0,31,31,10,
11,12,13,14,15,16,31,0,0,0,0,0,0,31,31
760 DATE 124,198,190,162,186,198,124,0
770 DATE 56,108,214,186,130,186,238,0
780 DATE 238,186,146,170,186,170,238,0
790 DATE 254,130,190,132,190,130,254,0
800 DATE 124,198,186,170,186,198,124,0
810 DATE 238,170,186,214,108,56,0
820 DATE 254,130,190,132,190,130,254,0
830 DATE 252,134,186,134,186,238,0
```

To get a better comprehension, a short commentary about the code is showed bellow:

020 to 100. Main loop.

110 to 180. Set enemy starship parameters.

190 to 220. Collision check procedure.

230 to 260. Crashed enemy starship procedure.

270 to 290. Score and highscore view.

300 to 390. Game over view.

400 to 440. Crashed user starship procedure.

450 to 480. Start game environment.

490 to 490. Clear sprites of the screen.

500 to end. Set graphic resources and tables.

Last but not least, this method is also used in compiled languages because of its efficiency.

For example, there is a compiler for the MSX system called xbasic (3). If you compile the previous test, you will see the following diferences:

Firstly, the program which uses the sine function: The running of the program lasts around 2 seconds. It is fairly fast.

Finally, the program which use precalculated sine function values: The running of the program lasts around a half second. This is at full speed. The diferences can be seen in the figure 3.

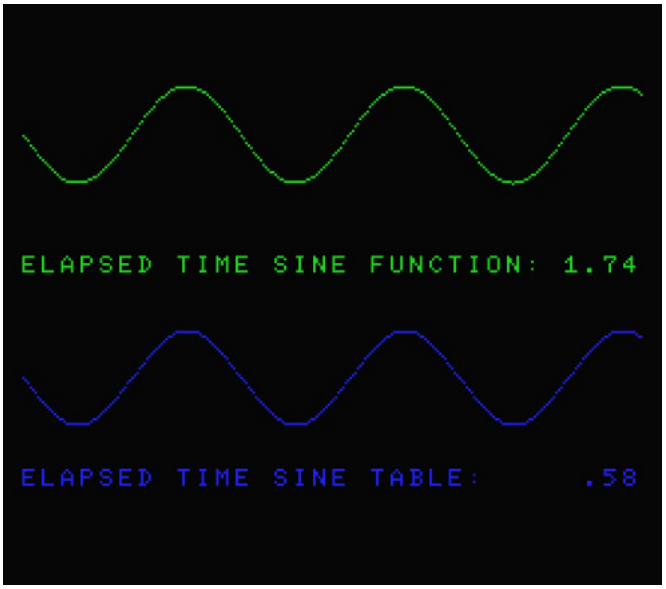


Fig. 3 - X-BASIC (computed and pre-computed)

In view of all this, I would like to point out the following:

The elapsed time from the test in the interpreted basic using sin table and the elapsed time from the test using sin function in a compiled basic program are approximately the same, around 2 seconds.

Thereby, this fact could mean the compiler uses tables to get the fuction values as well.

In the next article, we are going to improve something such as the background stage keeping up the program performance.

As is often said: the optimal systems are the most efficient and effectual systems.

Have fun!

References mentioned in the article:

1. https://map.grauw.nl/articles/basic_tips_tricks.php

2. https://en.m.wikipedia.org/wiki/MSX_BASIC

3. https://www.msx.org/wiki/Category:X-BASIC

Download demo disk:
https://retromagazine.net/download/demo.dsk

Turbo Pascal + Assembly: fading text in DOS

by The Orbital Crew - Alessandro Mazzola aka "Mr.H"

How many times have we come across demos or intros of games that showed on-screen text with a fading effect?...many times, I'm sure.
With this very first part of the new column devoted to programming, I want to explain precisely how this is possible.

So turn on your dusty PC, dim light, put on a good cup of coffee, stretch your fingers and let's get started right away! :-)

Introduction:
Fading text is a very nice practice to use especially in demoscene introductions or games. Achieving such an effect is not difficult, you just need to know how and where to aim to achieve a satisfactory result. Each color is composed in equal or different measures of the main tones: Red, Green and Blue, simply called RGB.

Analysis:
In the DOS environment, particularly in text video mode, you have 15 different colors and each individual color has its own register managed by the DAC (Digital Analogic Converter) which sets each color and its RGB values. Let us consider color 7 which by default is set as Light Gray is its RGB register is composed as follows:
RED has a value of 43
GREEN has a value of 43
BLUE has a value of 43
Now if we raise the Red and Green value to the maximum (63) and decrease BLUE to 0, we will get a nice deep Yellow.
Okay, but how can we translate this into programming?
As mentioned it is not complicated, but we need the assembly to come to our rescue and I can assure that the assembly is part of the pascal turbo so we can call ASM code safely in the source.

```
untitled
{ TESTO IN DISSOLVENZA:              }
{ þ Modalit… video TESTO (standard).  }
{ þ Codice in puro pascal e assembly. }
{ Orbital Crew / Code by Mr "H"       }

uses Crt;
{ ------------------------------------------------------------------------ }
  procedure SetDacColor(color, dac: byte); assembler;
  asm
     mov ax, 1000h
     mov bl, color
     mov bh, dac
     int 10h
  end;
{ ------------------------------------------------------------------------ }
  procedure SetRgbColor(color, r, g, b: longint);
  begin
    Port[$3c8] := color;
    Port[$3c9] := r;  { red   }
    Port[$3c9] := g;  { green }
    Port[$3c9] := b;  { blue  }
  end;
{ ------------------------------------------------------------------------ }

var
  c: integer;

begin
  ClrScr;
  GotoXY(30, 10);
  TextColor(7);
  Write('Hello World...');

  { Convocazione registro DAC e parit… del colore 7 }
  SetDacColor(7, 7);

  { cicli gradazioni ------------------------------------------------ }
    for c := 0 to 40 do begin SetRgbColor(7,c,c,c); delay(50); end;
    Delay(800);
    for c := 40 to 63 do begin SetRgbColor(7,c,c,c); delay(10); end;
    for c := 63 downto 0 do begin SetRgbColor(7,c,c,c); delay(20); end;
  { ------------------------------------------------------------------ }

  { Reimposto il modo testo }
  asm
    mov ax, 03h
    int 10h
  end;

end.
```

Development:
We have to create two separate procedures, one precisely in assembly the other in pascal code and both help us set the colors and their RGB values. The first procedure will interpolate the DAC and set the color we intend to change in the opening while the second procedure sets the RGB values through the ports now ready to receive the data. Once we have created our procedures we only need to increase the gradations of RGB through the use of loops, which in this case the classic FOR loops are fine. As you will notice in the source I have inserted three different cycles, this is to create a more creative animation, in fact, the first cycle increases from 0 to 45 and then stops through a delay, afterwards it increases further to the maximum and then decreases towards black.

Listing:

```
{ FADING TEXT: }
{ þ TEXT video mode (standard).          }
{ þ Code in pure pascal and assembly.    }
{ Orbital Crew / Code by Mr "H"          }

uses Crt;
{ ---------------------------------------
---------------------------------- }
{ This procedure will deal with the invocation
of the DAC register }
{ and ability in receiving RGB
```

```
ports.                                          }
   procedure SetDacColor(color, dac: byte);
assembler;
  asm
     mov ax, 1000h
     mov bl, color
     mov bh, dac
     int 10h
  end;
{ ------------------------------------
---------------------------------- }
{ This procedure sets the RGB values of the
chosen color. }
  procedure SetRgbColor(color, r, g, b:
longint);
  begin
    Port[$3c8] := color;
    Port[$3c9] := r;  { red   }
    Port[$3c9] := g;  { green }
    Port[$3c9] := b;  { blue  }
  end;
{ ------------------------------------
---------------------------------- }

var
  c: integer;

begin
  ClrScr;
  GotoXY(30, 10);
  TextColor(7);
  Write('Hello World...');

  { DAC register convocation and color parity
7 }
  SetDacColor(7, 7);
   SetRGBColor(7, 0, 0, 0); { Initialize the
color to deep black. }
   { cicli gradazioni ----------------------
---------------------------- }
    for c := 0 to 40 do begin
SetRgbColor(7,c,c,c); delay(50); end;
    Delay(800);
    for c := 40 to 63 do begin
SetRgbColor(7,c,c,c); delay(10); end;
    for c := 63 downto 0 do begin
SetRgbColor(7,c,c,c); delay(20); end;
  { ----------------------------------
------------------------------ }

  { Reset text mode }
  asm
    mov ax, 03h
    int 10h
  end;

end.
```

Conclusion:

The color taken as a guinea pig is 7 (Light Gray) but we can choose any other color from those made available by the text mode, i.e., from 0 to 15. In the graphics modes the method is about the same, only the amount of colors available from the mode set changes, for example, in the 13h MCGA mode we have 256 colors available. Also it is important to remember that once an RGB register is set to a particular color it will remain so until reset with the original values or a simple call to int 10h service 03h in AX will be needed to reset everything originally as before. The latter operation was my choice in this source.

I hope it is of interest to you and that you experiment with the code by making changes yourself, only then will you learn better.

Thank you and good programming

Source + executable:
https://www.zone640k.com/public/PROG01.RAR

Turbo Pascal 7.0
https://www.zone640k.com/public/bp7.rar
Extract the contents of the archive. In the BP7 path you will find two separate files: turbo.exe for the classic turbo pascal and TPX.EXE for a version that eliminates the processor timing-delay problem.

This article, published courtesy of the author, is part of a programming column edited by the author in his facebook group:
RetroComputer Planet
https://www.facebook.com/groups/2643999585815805

May the FORTH be with us - part four

durexForth for Commodore 64

by Francesco Fiorentini

After a brief absence, it was since issue 29 ITA that I hadn't mentioned it again, I want to return to writing about the Forth language again. This time, however, I want to do so by telling you about a project that is a real bridge between past, present and future.

durex Forth

Although there are several portings of the Forth language for the Commodore 64, durex Forth is perhaps one of the most interesting ones. Why? It is quickly said, durex Forth is a project still in full development phase, in fact, the last update dates back to July 20, 2022, as you can see from the official site on github:
https://github.com/jkotlinski/durexforth

Durex Forth is a modern version of the Forth language that includes a clone of vi, also written in Forth, a high-resolution graphics library, and support for MML music. DurexForth is fast and easy to use. It is in fact the fastest Forth for C64, running is about 50 times faster than Basic V2. It also implements the standard Forth 2012 core so it is easily used by anyone familiar with this language without suffering the limitations of older implementations.

If you would like to learn more about the Forth 2012 standard, find the list of supported words here:
https://forth-standard.org/standard/core

Here you will find an excellent manual for getting started with the Forth language:
https://www.forth.com/starting-forth/

Let's find out about durex forth

Obviously since it is a dialect, while it has a similar syntax to the Forth of the Jupiter ACE, it also has many differences that we need to learn in order not to run into mistakes.

The command to access the durex Forth dictionary is words. As we can see from the two images in Figure 1, the basic dictionary is significantly richer than that of the Jupiter ACE. The command to clean the screen, on the other hand, is page. I must admit that without the help of the manual I would never figured out.

rvs instead prints the text in reverse mode.

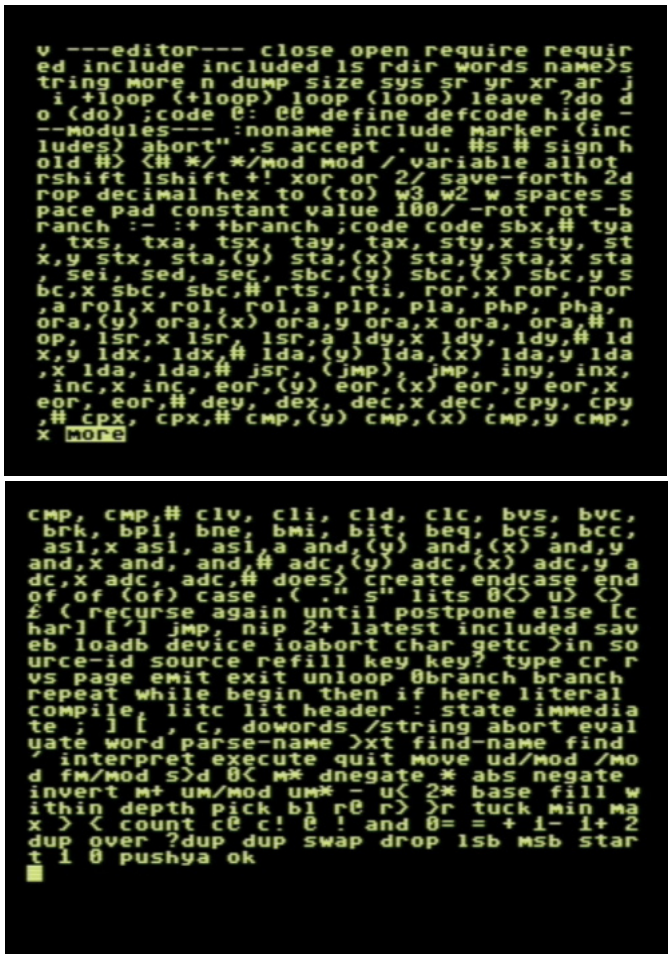

v ---editor--- close open require requir
ed include included ls rdir words name>s
tring more n dump size sys sr yr xr ar j
i +loop (+loop) loop (loop) leave ?do d
o (do) ;code @: @@ define defcode hide -
--modules--- :noname include marker (inc
ludes) abort" .s accept . u. #s # sign h
old #) (# */ */mod mod / variable allot
rshift lshift +! xor or 2/ save-forth 2d
rop decimal hex to (to) w3 w2 w spaces s
pace pad constant value 100/ -rot rot -b
ranch :- :+ +branch ;code code sbx,# tya
, txs, txa, tsx, tay, tax, sty,x sty, st
x,y stx, sta,(y) sta,(x) sta,y sta,x sta
, sei, sed, sec, sbc,(y) sbc,(x) sbc,y s
bc,x sbc, sbc,# rts, rti, ror,x ror, ror
,a rol,x rol, rol,a plp, pla, php, pha,
ora,(y) ora,(x) ora,y ora,x ora, ora,# n
op, lsr,x lsr, lsr,a ldy,x ldy, ldy,# ld
x,y ldx, ldx,# lda,(y) lda,(x) lda,y lda
,x lda, lda,# jsr, (jmp), jmp, iny, inx,
inc,x inc, eor,(y) eor,(x) eor,y eor,x
eor, eor,# dey, dex, dec,x dec, cpy, cpy
,# cpx, cpx,# cmp,(y) cmp,(x) cmp,y cmp,
x more
cmp, cmp,# clv, cli, cld, clc, bvs, bvc,
brk, bpl, bne, bmi, bit, beq, bcs, bcc,
asl,x asl, asl,a and,(y) and,(x) and,y
and,x and, and,# adc,(y) adc,(x) adc,y a
dc,x adc, adc,# does} create endcase end
of of (of) case .(." s" 1its 0<> u> <>
£ (recurse again until postpone else [c
har] ['] jmp, nip 2+ latest included sav
eb loadb device ioabort char getc >in so
urce-id source refill key key? type cr r
vs page emit exit unloop 0branch branch
repeat while begin then if here literal
compile, litc lit header : state immedia
te ;] [, c, dowords /string abort eval
uate word parse-name >xt find-name find
' interpret execute quit move ud/mod /mo
d fm/mod s>d 0< m* dnegate * abs negate
invert m+ um/mod um* - u< 2* base fill w
ithin depth pick bl r@ r> >r tuck min ma
x > < count c@ c! @ ! and 0= = + 1- 1+ 2
dup over ?dup dup swap drop lsb msb star
t 1 0 pushya ok

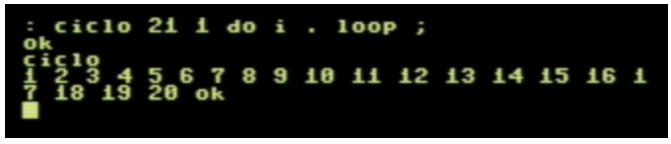
Fig. 1 - The rich vocabulary of the durex Forth

Since we like to get right down to business, let's try writing some simple little programs to familiarize ourselves with the durex Forth.

Try typing the following:

```
: loop 21 1 do i . loop ;
```

A simple program that, using the do ... loop, prints numbers from 1 to 20 on the screen. A very simple program on the surface, but one that requires a minimum of explanation especially for those who, like me, are new to this fantastic language.



First we should note that the command : <xxx> is used to define a new word.
This will be added to the durex Forth vocabulary, in fact,

if you try to type words again you will see that the word cycle appears in the list of available words.
Also note the two numbers before the do command: 21 is called the "limit" and the number 1 is called the "index." They basically define the starting value of the index, and the ending limit. Basically in this way we are simulating a more familiar for loop... next.

This example will clarify the concept immediately:

```
: loop 26 6 do i . loop ;
```

There is also something else worth noting, the variable i (and reflexively j). Variables i and j are to be used within the do loop constructs. i provides the index of the inner loop, j the index of the outer loop.

```
ok
: ciclo 26 6 do i . loop ;
ok
ciclo
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
 21 22 23 24 25 ok
```

You may have noticed that the numbers, in all of these examples are printed pasted in the same line. But what if we want to print them one per line? How can we go "carriage return"? We can use the cr carriage return command.

```
: loop 21 1 do i . cr loop ;
```

Let us now try something slightly more complicated.
This little program is an example of a do ... nested loop. Basically the index of the outer loop is multiplied by the index of the inner loop and the result is displayed on the screen.

```
: ciclo 21 1 do i . cr loop ;
ok
ciclo
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
ok
```

```
: multiply
11 1 do
  11 1 do
    j i * .
  loop
  cr
loop ;
```

We are progressing in small steps, but we will get to something more interesting in future articles.

```
11 1 do
ok
  11 1 do
ok
    j i * .
ok
  loop
ok
  cr
ok
loop ;
ok
molt
1 2 3 4 5 6 7 8 9 10
2 4 6 8 10 12 14 16 18 20
3 6 9 12 15 18 21 24 27 30
4 8 12 16 20 24 28 32 36 40
5 10 15 20 25 30 35 40 45 50
6 12 18 24 30 36 42 48 54 60
7 14 21 28 35 42 49 56 63 70
8 16 24 32 40 48 56 64 72 80
9 18 27 36 45 54 63 72 81 90
10 20 30 40 50 60 70 80 90 100
ok
```

Unfortunately, the durex Forth operator's manual (in Figure 2) is really basic and lacks practical examples that can guide novice users to discover this dialect.

Fig. 2 - The durex forth manual

Atari 50: The Anniversary Celebration

A journey through history of video-game ...and more

by Carlo Nithaiah Del Mar Pirazzini and Simone Camminata

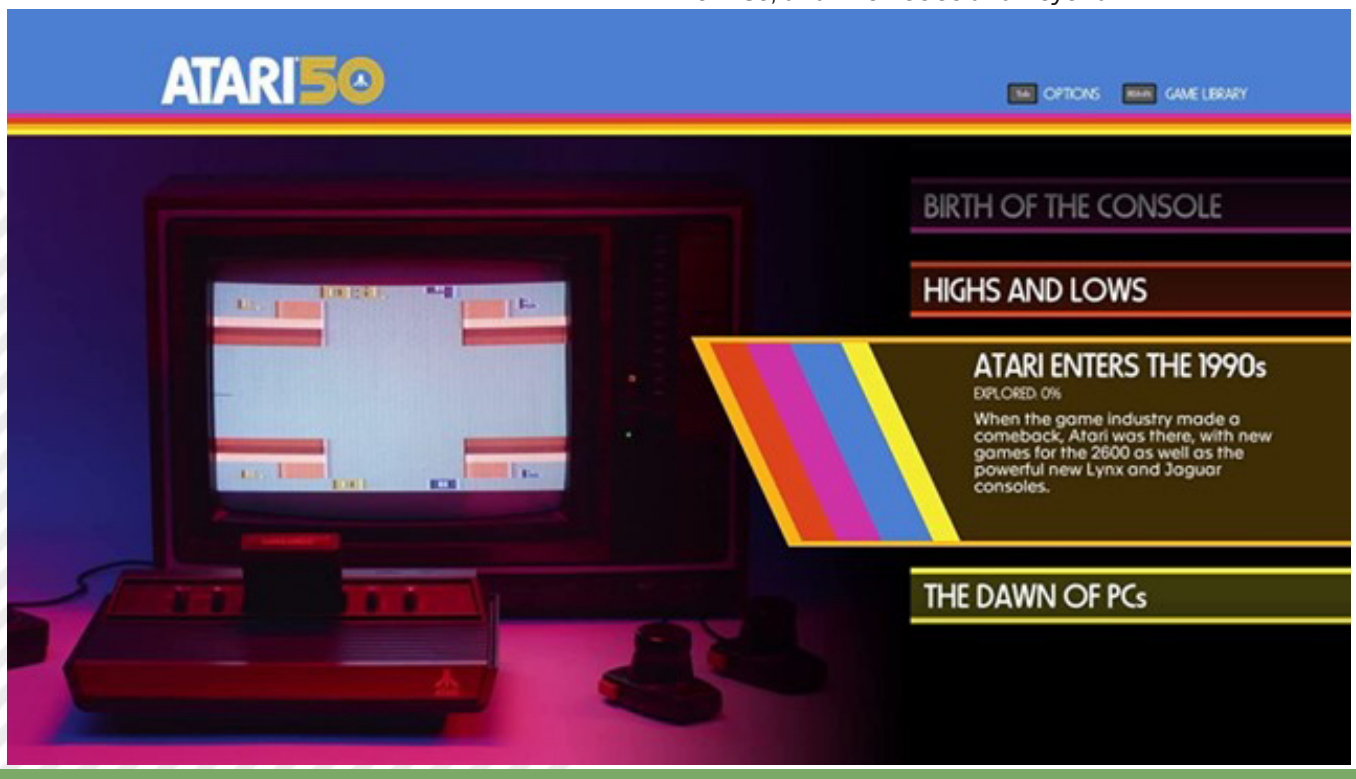
Until a few years ago, Atari seemed a relic of the past: an iconic logo relegated to books and documentaries.
A brand covered in dust and stained by many mistakes but also full of glory.

If we fast-forward through our video recorder of time we arrive at today, or rather we arrive at the new leadership of the company, CEO Wade Rosen, who has paid off in time to make this Atari 50: The Anniversary Celebration. Rosen became head of Atari in April 2021, he encouraged the reinvention of the company while keeping the focus on the glorious past.
The Recharged series, in particular, was a triumph. SneakyBox and Adamvision Studios' new interpretations of the classics Breakout and Yar's Revenge were enthusiastically received.

With the collaboration of Digital Eclipse, he presents us with this title that falls somewhere between popularization and video game.
The gamble paid off. Atari 50 may be the best collection of games ever made and should be the basic model for

future developers to follow.
This is not just a package of titles that we judge by the quality of the title itself-it is a museum. A path that guides one to the discovery of the den of innovation and madness that was the early Atari.
As soon as you start Atari 50, it feels like an interactive encyclopedia. You can jump to the game, which is tempting, since you are spoiled for choice with 90 titles, but the main mode of ATARI 50 is exploration of the company through timelines.

The experience is divided into five chapters: Arcade Origins, Birth of the Console, Highs and Lows, The Dawn of PCs, and The 1990s and Beyond.


ATARI50
OPTIONS
GAME LIBRARY
BIRTH OF THE CONSOLE
HIGHS AND LOWS
ATARI ENTERS THE 1990s
EXPLORED: 0%
When the game industry made a comeback, Atari was there, with new games for the 2600 as well as the powerful new Lynx and Jaguar consoles.
THE DAWN OF PCs

THE DAWN OF PCs
BACK
GAME LIBRARY
1979
Atari 400
The $499 Atari 400 computer's defining feature was its monopanel "membrane" keyboard, which was lower-cost and could better survive a drink being dropped on top of it, but otherwise made typing a laborious chore. Its low price, though, garnered it twice as many sales as the 800.
ZOOM

Each nicely breaks down Atari's history with clean, clear narratives, allowing access to original material and the games themselves.

We are not forced to read or look at anything to progress through the experience; its simple approach to progression to depth allows us to dig as deep as we want into certain points, such as consoles or industry developments. In addition, Atari 50's light-hearted ludicization of every piece of information (pictures, videos, manuals, and more) encourages us to explore what's there.

The videos are never too long; they stick to the topic at hand, introduce important elements and offer rich anecdotes. Crucially, the history section that is never presumptuous. Although key figures show pride in past work, they are also able to tell us about mistakes, criticisms, and failures.

CORPORAL MCFUR, THIS IS GENERAL PATENT! WE JUST LOST AN ARMADA AN HOUR AGO. RECON REPORTS SHOW SOMETHING CALLED OOD-IT HAS ENTERED YOUR SECTOR! HEADS-UP MCFUR...

The infamous Alamogordo burial images from 1983 are also shown (although the ET game is never mentioned, but that's okay-we don't miss it).
There is also so much to play and discover, even in the key of semi-unknown titles such as those for Atari Jaguar. Despite the strengths, there is one major sticking point. Perhaps even more than one. Some games are not taken care of from the control point of view for example. It happens that the controls do not respond correctly.

Missing some historical titles (in this case perhaps due to lack of official licenses) such as Star Raiders for Atari 400/800. Missing is a section devoted to Atari ST titles and a more substantial section for Atari Lynx.
Also missing is any reference to anything produced by Atari under license from third parties. For example, the section devoted to some of Atari's pinball machines is missing.

However, Atari 50 never seems anything less than the celebration it offers. A connecting point between us old time gamers and the new generations who want to rediscover.

A good book, perhaps a Chapter One -- waiting for a second textbook.

Retro Gadgets... building a Game Boy has never been so fun and easy (and not just a GB)

by Simone Camminata

Working in the workshop. Screwdrivers, soldering iron, schematics, PLA-what a beauty!
Retro Gadgets is an interesting product developed by the Bologna-based Evil Licorice. An experiment that takes us back to the past.
Our Pc becomes our laboratory and we virtually go back to disassembling, reassembling and testing electronic objects (in Bolognese dialect, the "ciappini" or small things).

This product really makes us sit in front of a classic workbench with a square cutting board. But we are in front of a screen and ready to play with our gadgets.

Background It is not a video game but it is an experience. What we can do. Anything or almost anything! We can create, code and customize our own electronic devices and share them with other Geeks through the Web.

We can build our Pcb, process it, maybe test it and see how the buttons, switches work.
Each product can be assembled and reassembled several times and tested, put online via the Steam Workshop to be tested, inspected and modified by other people as well. It is also interesting as an educational tool that allows you to create your own objects with full support for Lua code, including a documented editor.

Fig. 2 - Working on a small board

This allows "gadgets" to actually function in a virtual sense, from video game consoles to weather stations, calculators and more.

The product runs only on a PC and requires a 64bit processor (Intel Core2 or Amd equivalent), 4 Mb Ram, DirectX 9.0 c, 300 mb Hd, and a decent video card as a base.

What I liked

It is surprisingly engaging especially for the technically and manually minded. Easy to handle and a lot of fun.
There is abundant documentation with lots of videos and tutorials on the web.

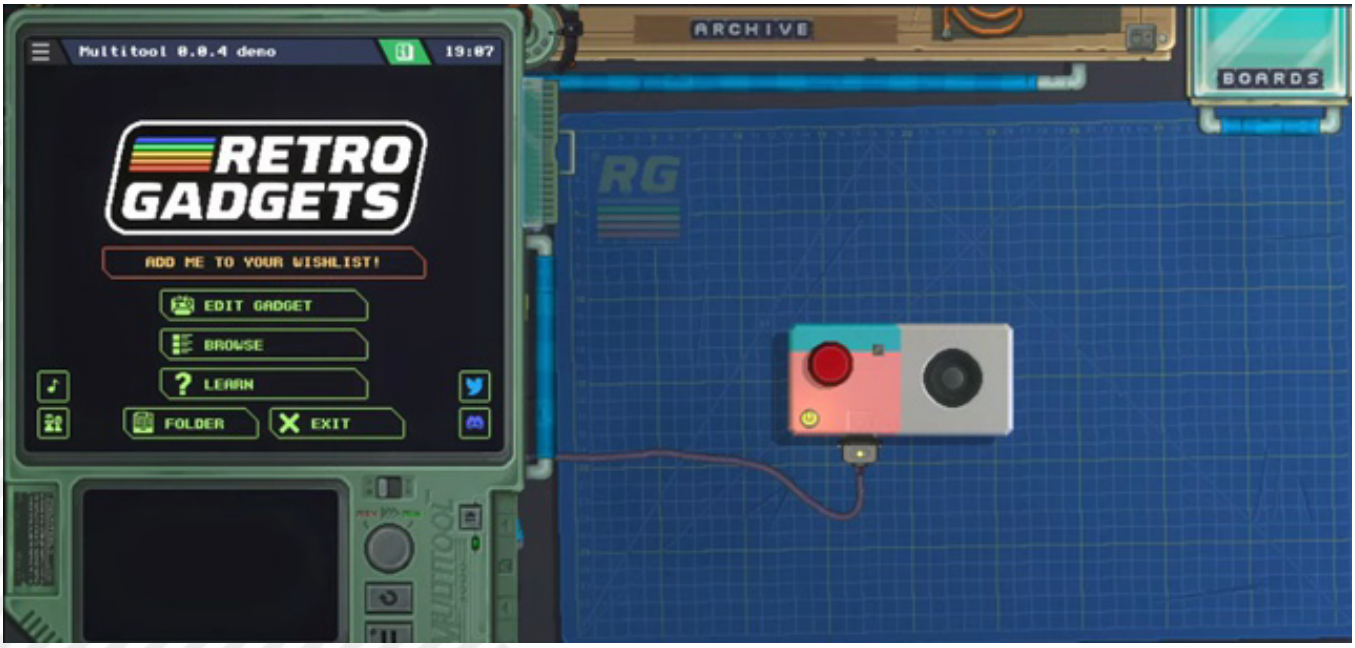


Fig. 1 - The work bench

Fig. 3 - Example of a portable console

It is essential to make one thing clear, however. It is not a game. It is not a throwaway title and requires commitment once installed. If you are looking for something low-tech, it is not for you.

Summing up, it is a product for those who like to build and spend hours examining objects and how they work. You can purchase it from here: https://store.steampowered.com/app/1730260/Retro_Gadgets/

We thank the folks at **Evil Licorice** for providing the trial version for review.

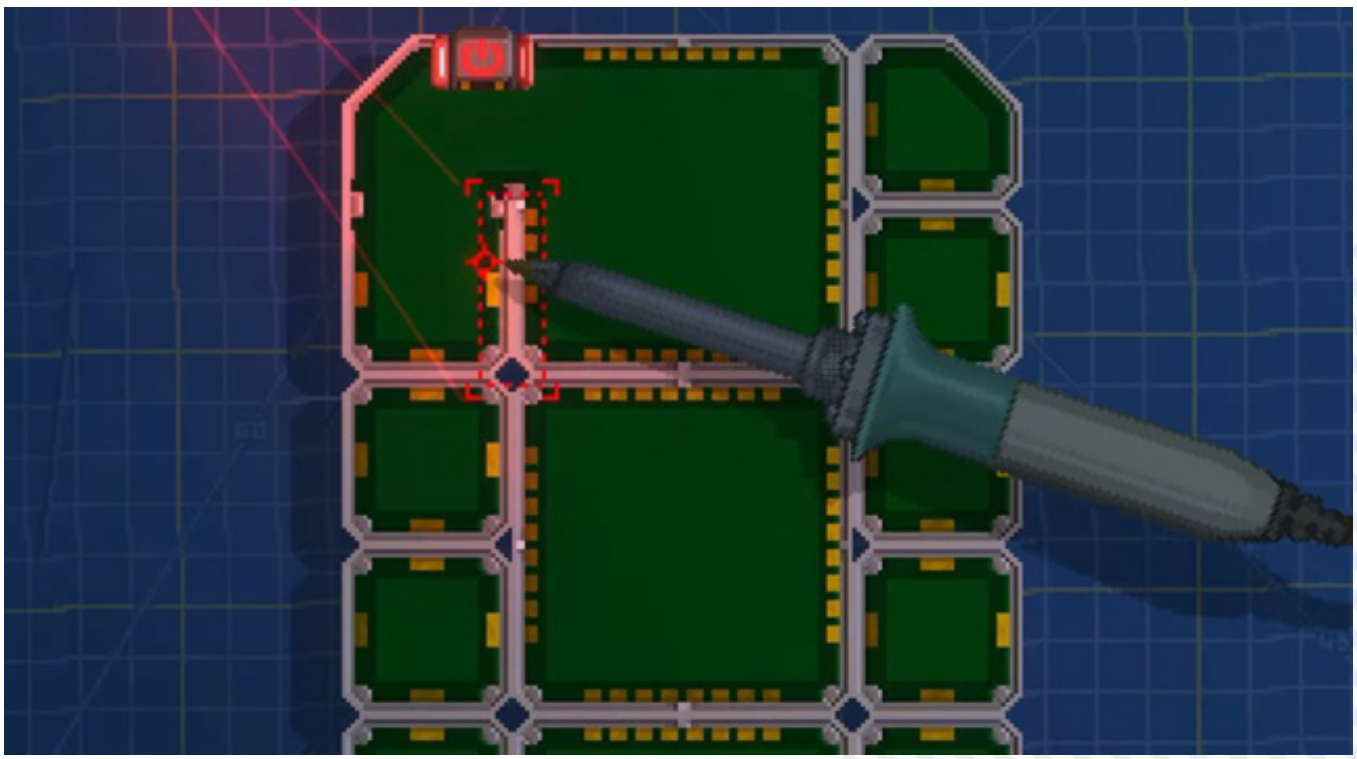


Fig. 4 - Welding session

Debugging in assembly (C64, Kick Assembler)

by Marco Pistorio

Debugging, a developer's "blessing and curse."
Sure, at least until AI takes our place in program coding! It is these days the release of the beta of the OpenAI chatbot, which seems to be very promising, alas :D
But as long as coding is our bread and butter, we will have to fend for ourselves.

Generally, when developing, four phases are identified that relate to the implementation of the software namely:
1) analysis,
2) coding,
3) debugging,
4) the release.

In the analysis, the problem to be solved is studied, the requirements to be met by the software are defined, the so-called "scenario" of use etc. is analyzed.
Coding refers to the writing of the actual code, which should immediately follow the previous stage, namely analysis.
Debugging is the phase where we check how the software behaves, whether the results we get are as expected or not. If something does not work properly, go back to the previous step, which is coding, and then check again.
When the requirements set initially have been met, debugging is finished because the code returns the expected data etc we move on to the final phase, which is release, the delivery of the software ready for use.

There is quite a bit of specialized literature on this, dealing with the so-called software life cycle.
I have made a very simplified speech in order to be clearer and to make the reading of this article more accessible especially for newcomers.
I have avoided distinguishing between "waterfall," "spiral," iterative, and so forth models, but for those interested in learning more, below is the related link to the topic on Wikipedia:
https://it.wikipedia.org/wiki/Ciclo_di_vita_del_software

It should be noted that the concepts outlined apply to those developing within a team as well as those developing independently.
Finally, the concepts exposed are independent of the language used in coding.
Now let's focus on point 3 already mentioned, which is debugging, which will be the topic I will try to expound on in this article, focusing particularly on assembly 6510, that is, the Commodore 64 assembly.
Imagine a situation where a routine does not return expected values.
Or again, imagine a routine, perhaps even one not written by you, and wonder what that routine does, what values it provides, starting from certain starting values in the various registers or in certain memory locations.

Analyzing routines, making corrections when necessary, is part of the normality of a programmer's work.
Each of us, in this area, also based on our own experience, will fulfill this task differently.
Some people will do everything with pen and paper, who knows. Who will do everything in their head, why not? Those who will write the intermediate values obtained in RAM memory locations that they will then go to view. Those who will use an interactive debugger to test the program as it runs.

The latter seems to me to be the most interesting solution. We have some really good tools available today in this regard. One such tool, which I have had the pleasure of learning about you will find at this address:
https://sourceforge.net/projects/c64-debugger/files/

It is, in a nutshell, a suitably (and also brilliantly, in fact...) modified VICE emulator that allows you, in real time (or nearly so), quite intuitively moreover, to check the memory during the execution of a program, create breakpoints, examine the various registers of the VIC-II, the character set at a given instant, what is at a certain place on the screen at a given time, which character, which sprite, and much, much more.

Instead, here I will show you another possible approach, certainly simpler, much more modest.

However, it can still be convenient in many circumstances, when you are faced with (relatively) simple routines, or while you are writing them, to do virtually immediate debugging, without bothering with special external tools.
Let us imagine a code outline as follows:

```
lda #01
```

```
    ldx #02
s0:
    ldy #03
s1:
    nop

    dey
    bne s1
    dex
    bne s0

    rts
```

It's a fairly simple routine actually, at least for those who chew assembly a bit.
Inside the accumulator we load the value 1, inside the x register we load 2 and finally in the y register we load 3. Next we decrement the y register by 1 and until it is zero, we jump to address s1.
When the y register is zero, we decrement the x register by 1 and until it is zero, we jump to address s0, where, immediately thereafter, we load the y register with the value 3 again.
At some point, when register x is more precisely zeroed, the routine will end.
What will be the final values found within the various registers at the end of the routine?
The X register will certainly be 0. The accumulator, having not been varied, will still contain the value 1.
The Y register, on the other hand, since the X register will have cleared for the routine to terminate, must of necessity contain 0.
Only by assuming such a value in fact can the x register have decremented until the routine is terminated.

So, summarizing briefly, at the end of the routine we will have: A=1, X=0, Y=0.

Wouldn't it be convenient to find something that allows us to get these values automatically, without thinking about it too much?
Wouldn't it be just as convenient to know at a specific location in the routine, say at the location of the NOP instruction (which does absolutely nothing except consume two clock cycles), the values that registers A, X, and Y take automatically, along with perhaps some other data? I would certainly say so.

So I thought, by "inconveniencing" the BRK service routine and employing the stack, to create something that does just this specific debugging job (see fig. 2, at the end of the article).
The idea is a macro that, upon execution of a BRK instruction, will trigger, instead of the expected service routine, a routine that will print the values of the A (accumulator) register, X register, Y register, stack pointer (SP), and program counter (PC) register to me on the screen.
How does it work?
Meanwhile, I am going to replace the service routine related to the BRK instruction with a custom one, appropriately acting on memory locations $0316 and $0317 (Execution address of BRK service routine. Default: $FE66)
Within my debug service routine, which I called debug_handler (how fancy, right? :D) I retrieve from the stack the values related to registers a,y and x, which I save within three appropriate memory locations save_a, save_x and save_y.
I then also save the stack pointer to an appropriate location namely save_sp.
I then take, directly from the stack, the value of the program counter (PC) which I go to store within the appropriate save_pc location.
Let me remind you that the program counter is a 16-bit register that can hold a value between $0000 and $FFFF or 0-65535 in decimal, indicating what the address of the instruction currently being executed is.
Therefore, it is necessary to take not one but two values (low byte and high byte) to properly store the value of the program counter.
I will not elaborate further on this question. You can safely analyze the related code to understand exactly how I obtain this value.
Next is the easy part.
Through the KERNAL service routine $FFD2 I go to print the values of registers A,X,Y,SP and PC, as mentioned above.
Finally, I re-load the saved values related to registers A, X and Y by taking them from the memory locations that temporarily contained them, and finally, via the RTI instruction, the routine ends.

The exposed method, as mentioned above, operates as if it were a normal BRK service routine.
This method therefore cannot be used in all situations in which such a service routine cannot be called normally.
Also, making use of the KERNAL $FFD2 routine to print the various values, it needs the KERNAL itself for it to work properly.
It is incumbent on me to tell you that this one I present is a possible implementation.

It is certainly possible to investigate other solutions to

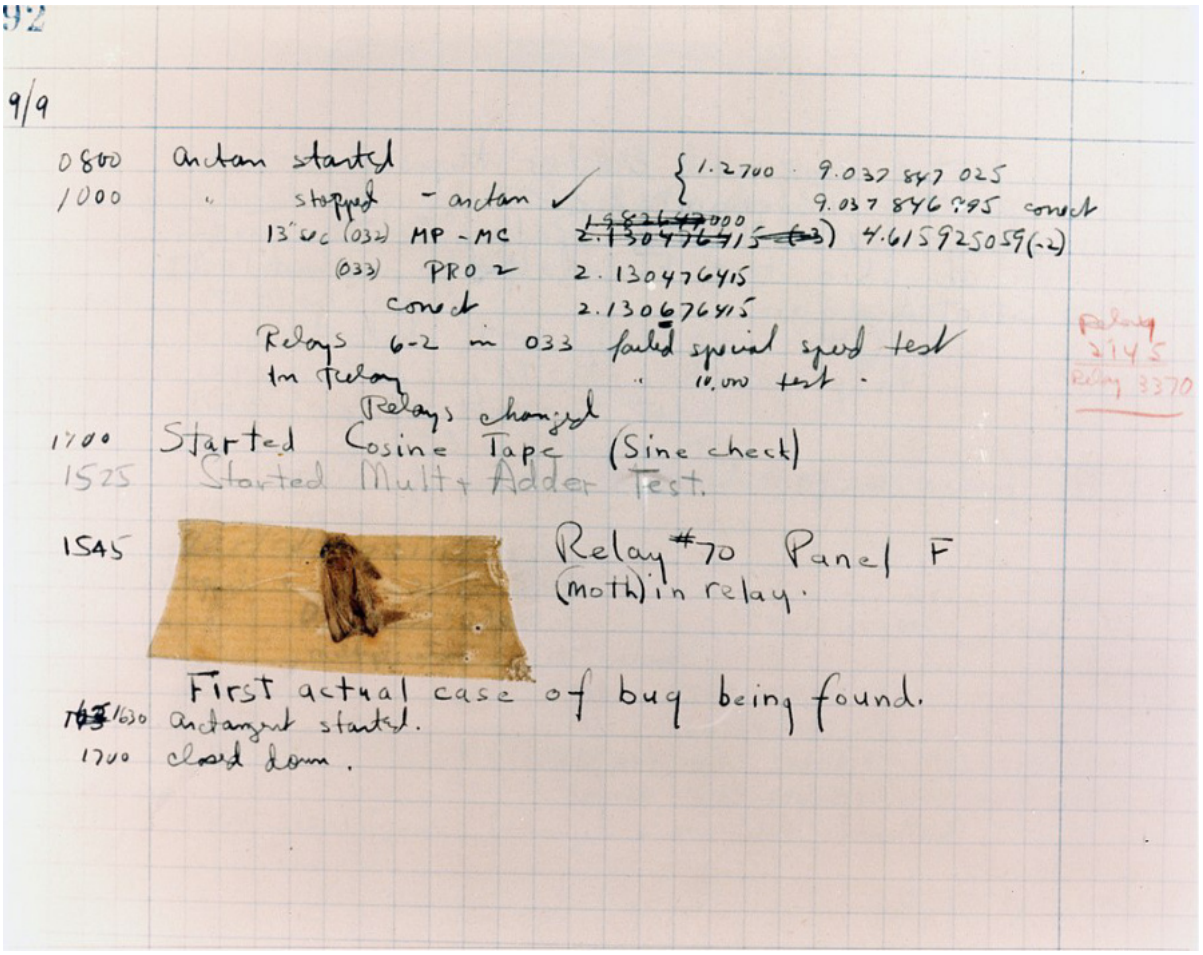

9/9
0800 Arctan started
1000 " stopped - arctan ✓
Relays 6-2 in 033 failed special speed test
Relays changed
1700 Started Cosine Tape (Sine check)
1525 Started Multy Adder Test.
1545 Relay #70 Panel F
(moth) in relay.
First actual case of bug being found.
1700 closed down.

Fig. 1 - Photo of what is the first real bug found in a computer, Sept. 9, 1947 (source Wikipedia)

overcome the limitations of this implementation.
My intent is to simply give you an idea, to show you one possible path among those that can be taken.
Therefore, I leave it to the usual attentive and willing reader to investigate, improve, and make any changes in this regard.

Below is the complete code of my solution, which follows the Kick Assembler syntax, and which you can compile without any modifications with this compiler but which, with proper corrections, should be easily "portable" to other compilers and...good debugging to all!!!

```
//////////////////////////////////////

.label BSOUT = $ffd2// Print character in accu

:BasicUpstart2(main)

.pc=$08F0
main:

    //BRK service routine management
    ldx #<debug_handler
    ldy #>debug_handler
    stx $0316
    sty $0317

    lda #01
    ldx #02
s0:
    ldy #03
s1:
    :debug($FF)
    nop

    dey
    bne s1

    dex
    bne s0

    :debug($00)

    rts


// https://codebase64.org/doku.php?id=base:
8_bit_to_hexadecimal_conversion

//**************************
// print Akku hex value
//**************************
OUTHEX: tax // save value for low nibble
        lsr // ignore CARRY and shift hi nybble to
lonybble pos.
        lsr             //
        lsr             //
        lsr             //
        jsr NIB2HEX    // print nibble
        txa             // restore value
        and #$0f       // Low nibble
        jsr NIB2HEX    // print nibble
        rts

//*********************
//* Akku low Nibble to Hex
//*********************
```

```
NIB2HEX: cmp #$0a//    Accu >= 10?
        bcs HEX        // Yes
        adc #$30//     Accu < 10
        jmp BSOUT // Print #$30 - #39
HEX:    adc #$36//     Accu >= 10, subtract #$09 to
get "A" to "F" (CARRY always set here)
       jmp BSOUT//    Print Accu (HEX nibble) and bye

////////////////////////////////////

.macro debug (value)
{
       brk
       .byte value
}

debug_handler:
{
       cld     // Clear decimal flag (to be sure...)

       pla
       tay
       pla
       tax
       pla

       sta save_a // Save 6502 registers
       stx save_x
       sty save_y

       tsx // Get stack pointer into X
       stx save_sp // Save it so we can print it

       ldy $103,x // PC high byte
       sty save_pc+1

       clc     // clear carry flag

       ldy $102,x // PC low byte
       dey     // -1 bytes (opcode BRK)
       cpy #$FF
       beq adj1

       jmp after_adj1

adj1:
      dec save_pc+1 // if carry is 1, sub 1 PC high byte

after_adj1:
       dey     // -1 bytes (opcode BRK parameter)
       cpy #$FF
       beq adj2
       jmp after_adj2

adj2:
      dec save_pc+1 // if carry is 1, sub 1 PC high byte

after_adj2:
       sty save_pc

////////////////////////////////////

       lda txt01+0
      jsr BSOUT
       lda txt01+1
       jsr BSOUT
       lda txt01+2
       jsr BSOUT

       lda save_a
       jsr OUTHEX

       lda txt01+3
       jsr BSOUT
////////////////////////////////////

       lda txt02+0
       jsr BSOUT
       lda txt02+1
       jsr BSOUT
       lda txt02+2
       jsr BSOUT

       lda save_x
       jsr OUTHEX

       lda txt02+3
      jsr BSOUT
////////////////////////////////////

       lda txt03+0
       jsr BSOUT
       lda txt03+1
       jsr BSOUT
       lda txt03+2
       jsr BSOUT

       lda save_y
       jsr OUTHEX

       lda txt03+3
       jsr BSOUT
////////////////////////////////////

       lda txt04+0
       jsr BSOUT
       lda txt04+1
       jsr BSOUT
       lda txt04+2
       jsr BSOUT
       lda txt04+3
       jsr BSOUT

       lda save_sp
       jsr OUTHEX

       lda txt04+4
       jsr BSOUT
////////////////////////////////////

       lda txt05+0
       jsr BSOUT
       lda txt05+1
       jsr BSOUT
       lda txt05+2
       jsr BSOUT
       lda txt05+3
       jsr BSOUT

       lda save_pc+1
       jsr OUTHEX

       lda save_pc+0
       jsr OUTHEX

       lda txt05+4
       jsr BSOUT
////////////////////////////////////

       lda save_a // Restore 6502 registers
       ldx save_x
       ldy save_y

       cli

      rti
}

save_a: .byte 00
save_x: .byte 00
save_y: .byte 00
save_sp:       .byte 00
```

```
save_pc:        .byte 00.00

txt01:
.text "A=$ "
txt02:
.text "X=$ "
txt03:
.text "Y=$ "
txt04:
.text "SP=$ "
txt05:
.text "PC=$"
.byte $0d

////////////////////////////////////
```

CURIOSITY.

Do you know what the use of the term "bug" (i.e., "bug," in English) is due to when referring to programming errors? Many of you will know this, but in dispensation to all other curious readers, here is what Wikipedia says about it:

"The widespread use of the term bug, which in English generically means a small insect, is linked to a curious anecdote dating back to the pioneering days of computing: on September 9, 1947, Lieutenant Grace Hopper and her team were searching for the cause of a Mark II computer malfunction when, to their amazement, they noticed that a moth had become stuck between the circuits. After removing the insect (at 3:45 p.m.), an operation that would restore the computer's smooth operation, Hopper pasted the removed moth onto the computer's logbook and noted, "1545. Relay #70 Panel F (moth) in relay. First actual case of bug being found." This log is preserved at the Smithsonian National Museum of American History." (see fig. 1)

Basically, it seems that one of the first computer errors was caused precisely...by a moth!!!

I conclude with warm greetings and sincerest wishes to all of you and your families for a peaceful Christmas and a prosperous New Year, fellow readers!

RESOURCES

- https://it.wikipedia.org/wiki/Ciclo_di_vita_del_software
- https://sourceforge.net/projects/c64-debugger/files/
- https://codebase64.org/doku.php?id=base:8_bit_to_hexadecimal_conversion
- http://theweb.dk/KickAssembler/Main.html#frontpage
- https://it.wikipedia.org/wiki/Bug

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C64 Programmer's Reference Guide - Copyright (C) 1982 by Commodore Business Machines, Inc.
Compute's_Mapping the 64 and 64C - Sheldon Leemon, Compute! Publications Inc 1984,1987

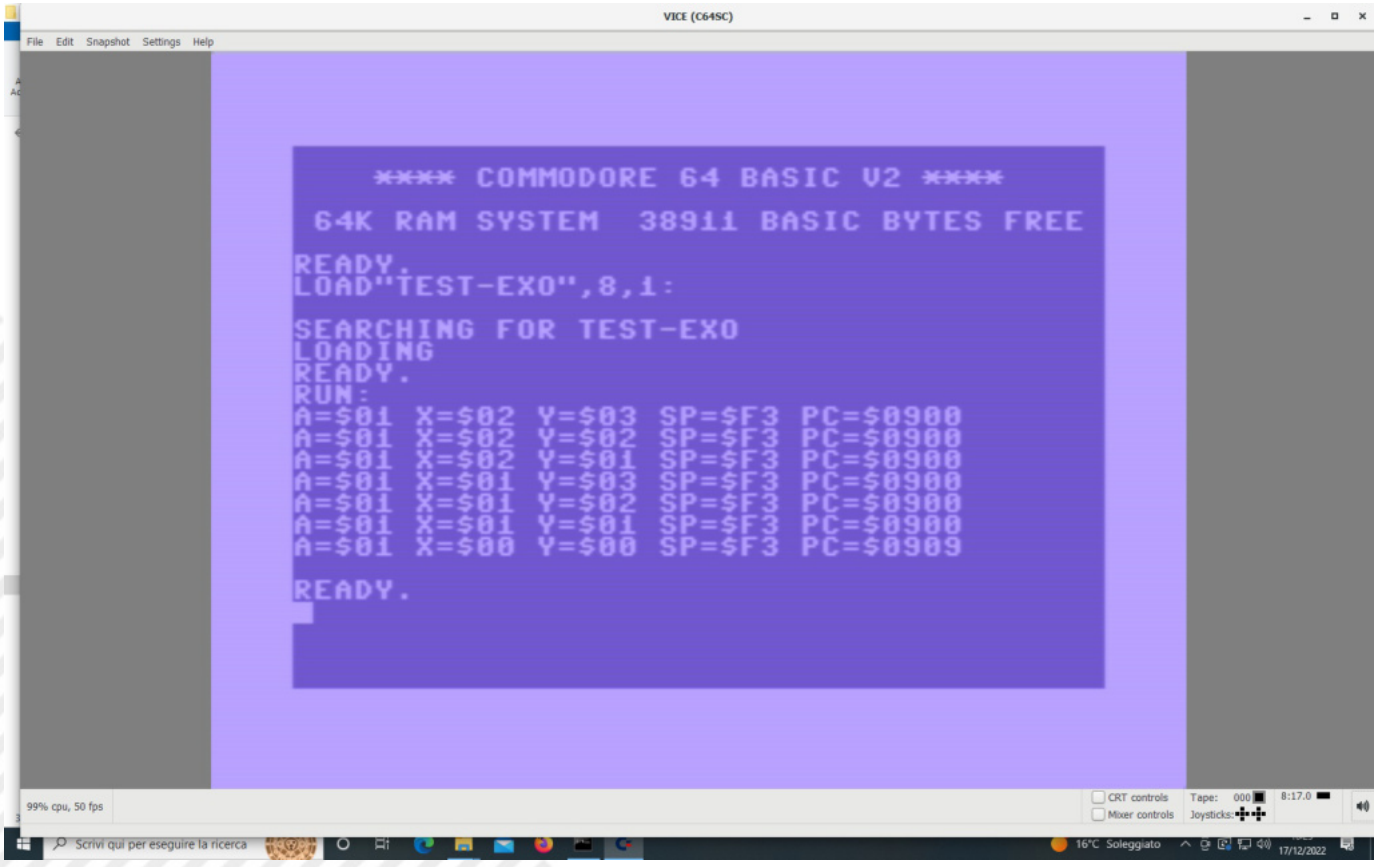


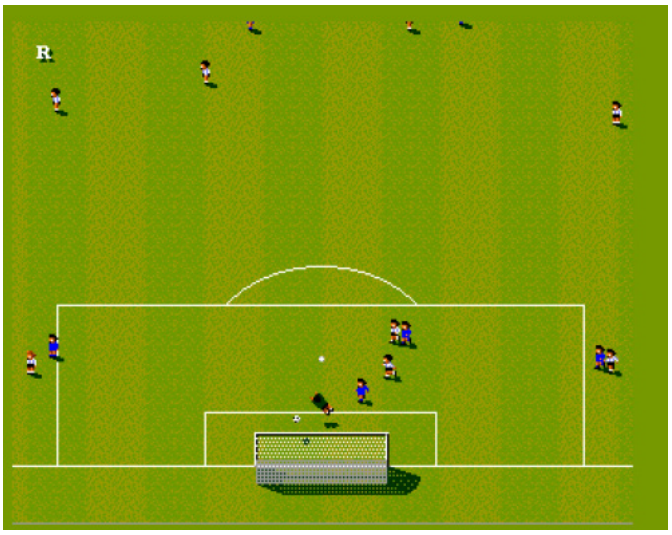
Fig. 2 - Output produced by the code provided in the article

SENSIBLE WORLD OF SOCCER:
A STORY THAT CONTINUES IN ITALY

by Francesco "iononsoleggere" Bizzini

First stop on RetroMagazine World's journey into the world of the communities of fans who still keep 80s and 90s video games alive today, releasing updates, organizing tournaments, publishing fanzines, even playing a role as social glue against the loneliness of our times. It starts with the guys here in Italy who continue to wear cleats and tread the digital fields of one of the most glorious soccer video games of the old century.

It's spelled Sensible World Of Soccer, but it reads hours and hours and hours spent smashing joysticks together with siblings, cousins and assorted classmates in a competitive attempt to win championships, tournaments, rankings and arrive happy at snack or dinner. We are talking about a title carved into the history of retro-computing and which slowly, brought to the world of 8- and 16-bit consoles as well, won millions of hearts, even outside that keyboard-and-mouse-equipped niche. But those who think that the title originally released in 1992 under the name Sensible Soccer is one of the many sports games, glorified by the usual four nerds out of some sort of vain nostalgia, are sorely mistaken. In 2007, the prestigious New York Times celebrated Sensible World of Soccer (edition released in 1994) as one of the ten most important video games of all time. No wonder then that the title never really ceased to exist with the demise of the machines for which it was intended. And so here we at RetroMagazine World went hunting for the most important Italian community dedicated to the immortal soccer pixel classic.



SWOS - Playfield

So we met with the guys from SWOSit and asked them to explain how it all came about and what they have been up to for years:

SWOSit was born back in 2014, basically to give a place to all Sensible Soccer lovers where they could play their favorite game online. We started from nothing and gradually built up a small 'Swosistic' world involving a nice chunk of Italian and foreign users. Our activities are very simple, in the past before the pandemic we also participated in various retrogaming and non-retrogaming events, like Game Week and various industry events, as well as organizing offline rallies where the title of Italian SWOS champion was up for grabs. On our site, on the other hand, we organize lots of tournaments of all kinds with the most diverse teams and modes (as we go along we also organize tournaments with real prizes that we deliver to the winner's home). We are currently playing the World Cup Qatar 2022, but our flagship is undoubtedly the legendary online career now in its 47th season, where more than 60 users actively participate. In fact, through a portal (known to everyone as a panel) we have recreated the structure of the mythical career that we were so passionate about in

EventoOffline 2016 during a meeting in Milano

our youth. Clearly with lots of improvements to adapt it to the present day. The goal, however, is always the same: you sign up, we create a team with which you start from the lowest series, the D series or C2 depending on how many participants we have. Through the soccer market you set it up by buying players from a real current database (updated as you go with the real values of the players) through ebay-style auctions, thus beginning your climb to the big leagues. All this complete with goalscorer rankings, cups, promotions and relegations. In addition to this we have another portal where we play tournaments, funcups or challenges between users, complete with ranking and roll of honor of the players on the site. In short, a small world of SWOS available to all fans.

Today there are many platforms on which to play SWOS, purely Amiga, ms-dos, xbox and pc. Which version do users in your community play the most?

Strictly the Amiga version, no kidding! If you want to play the real SWOS you can look no further!!! The legendary Amiga version is the one we grew up with and the one that has the best gameplay. How could we play with any other!!!?! Joking aside of course there are other versions, but we don't like them because of the gameplay far from the real SWOS and so we prefer not to use them.

But isn't playing online or entering your world complicated, especially for those with little time?

No, participating is very simple just sign up and through our discord or whatsapp channel, then you make arrangements with other participants to play... all very simple and easy since we have as deadline tournaments accessible to everyone.

Advice then for those who want to get into the field as a neophyte?

The advice to a new user is only one, jump into the fray as soon as possible and start stomping the pixelated fields online. I recommend online, not offline! We say this because playing online is a whole different thing than playing

GAZZETTA DELL SPORT? NO THANKS, WE HAVE SPORT SWOSIT!

As proof that the Community behind SWOSit is healthy, welcoming, full of imagination and united to make everyone have fun, we could not fail to mention their monthly magazine. Which is then just a paper, in digital version, but nevertheless this editorial production oozes with passion, self-mockery, and a desire to be together. In short, it is lovely. In this organ of information you will find, in addition to all the updates on how the tournaments are going, the announcement of community news, interviews with historical and other users, as well as highly goliardic moments such as the awarding of "pixel head of the month." In the last issue that honor fell to user Ziobestia, who was pinched for inflating auctions in terms of numbers of players allowed. Obviously pinched and fined. What a pixel head!

Il mensile di swosit tutte le notizie sul mondo Sensible World Of Soccer

Sport Swosit

www.swosit.com

Ridimensionamento campionati.
Da questa stagione, il numero di squadre in ogni serie verrà ridotto. Retrocessioni a gogo'

FINALMENTE SI RIPRENDE
Dopo la lunghissima sosta estiva partita a Giugno si reinizia. scricchiolii sinitri arrivano anche dagli arti destri

TESTA DI PIXEL DEL MESE.
Zlobestia
In carriera primavera crea aste oltre al numero di giocatori consentiti, ma solo perchè avevano nome di animali. Pagati e multato.
Che pixel

CARRIERA ONLINE STAGIONE 45

Riviviamo cos'e' successo la passata stagione.

NUOVA RUBRICA
Le domande del ca....zio

TORNEI E VARIE

SWOS INTERVISTA con DAVIDEFREAK

CARRIERA PRIMAVERA

and do it perfectly, they are monotonous but effective (laughs .Ed), others are more imaginative and score in many different ways. In short, a precise technical style or more effective than others to win does not exist, just as there is no style of play based on nationality, everyone has to find his own style, carry it forward and perfect himself as he goes along. The only real secret to performing better at SWOS is playing consistently and then having good dexterity, as it is a game with crazy playability, allowing you to score in so many different ways, but most importantly one of the first games in the world where the ball is not glued to the players' feet and by the grace of God it is essential to have the 'hot' hand to be able to joust on the court to the best of your ability.

What is your eventual relationship with the international scene and sensiblesoccer.de?

We have known each other for years, until a few years ago we used to jointly organize the Master of SWOS annually where the strongest players from our two communities would face each other and where the winner would be awarded the title of world champion of SWOS. It was a nice and fun thing but then for a variety of reasons the thing died and is currently no longer done. In a nutshell we have good relations despite being two totally different communities, so much so that a lot of users play on both against the CPU, so the sooner you start the better, but above all, don't beat yourself up if you get loud bangs at first, we've all been there! Playing against real players is much harder than playing against the CPU, but much much much more fun and as soon as you get the hang of it you too will start to have a say in the world of SWOS!!! As mentioned above, we only play the Amiga version and we do it with the legendary Kaillera (platform/client for online multiplayer game .Ed) which although dated still makes its own piggyback.

Italians, in international SWOS competitions, have been giving friends from other nations a run for their money for years. In your opinion, is there a "technical style" that sets the tricolor scene apart from others?

Let's say that everyone has their own style of play, some play in a 'machine' way i.e. they learn how to score a goal

WHAT IF I WANTED TO PLAY ONLINE WITH THE SWOSit COMMUNITY?

Do not worry, from what we could see you will not be sucked into millenial technicalities. On the contrary, the procedure for joining the initiatives organized by SWOSit is quite faithful to the tools born in the early days of Web 2.0: forums, chats, executable files and so on. In short you will have to go to www.swosit.com, go to the "getting started" section, register, and then pop over to the forum to introduce yourself, because politeness and courtesy is the mainstay of everything, elsewhere as in this community. When the welcoming part is filed, if you are not already operating on it, you need to equip yourself with a windows based pc and download from the "download" section of the site the client that you will use to "connect" and play with the community (which is then an already pre-configured version of Kaillera) and the kickstart needed for emulation to be placed in the ROM folder of the program. Once the above is installed and placed, only two small additional steps are needed to update and calibrate everything, steps that are clearly illustrated in this video tutorial. For everything else, for any doubts, questions, requests there is the official community chat and which hosts about twenty members ready to help you.

Photos of the winners of one of the two tournaments of the Italian sensible soccer offline Championship 2017

sites without any problems.

Offline, how are you doing?

We clearly being Italian and with a user base by force of things more Italian we devote ourselves more to our national scene rather than the international one, but let's say that we are very satisfied with what we have put up and we have organized over the years various offline gatherings in various parts of Italy such as Milan, Palermo, Rome, Rimini, Salerno, Trieste and so on. In addition, we have participated in various retrogaming, comic book events... unfortunately due to pandemic we had to suspend all that, but we plan to start again as soon as possible.

We are in the world of PES and FIFA, of nextgen consoles, so why is SWOS still relevant to you and what drives you to sacrifice time, effort, even money, to keep a community of a "30-year-old" game going?

Let's say that if you grew up with SWOS you will love it as long as you want to play video games. Honestly Fifa and Pes are nice but for those of us who grew up on bread and SWOS will never give you the heartbreak that this title gives you: its fantastic gameplay, its immediacy in playing it even after 30 years and unpredictability is unrivaled. Then again, these elements are what made it famous and loved by so many users. Then let's face it... playing SWOS makes us all a bit of a child again, and playing it online being able to compete with the strongest players in Italy and Europe in a wide variety of tournaments is a fantastic thing. You want to put playing the online career of SWOS compared to playing the Master of Pes!?!? (laughs with gusto .Ed). As for carrying on the community let's say that it is not so easy, especially as we get older and the time to devote to it is less and less, but given the many users we have and the fun there is in playing it ... for now we hold out and aim for our 9th birthday which will be next March. In this aspect we are overjoyed because Italian communities born before us always lasted a short time while we have been up for a lifetime now. The only regret (and he continues to laugh .Ed) is not having opened when we were younger, with plenty of free time on our hands and no wives and children to take care of.

Why would an old SWOS fan, who lived through the glorious years of the title, and who does not know of your existence today, join your community?

Simple, if you want to be a kid again and have fun or measure yourself against other real players, you can't help but come and play in SWOSit. With online Sensible Soccer lives a second youth and anyone who has never done it for me should try this experience. We have so many tournaments and leagues that a SWOS fan can't pass up the opportunity. In the end, it is not very challenging to play the tournaments: you just have to organize yourself

WHAT IF I WANT TO PLAY OFFLINE? OK, LET'S DO IT, BUT IN THE ITALIAN WAY!

As mentioned in the interview, the version of SWOS most beloved by Italian players is the original, AMIGA version. Having ascertained that, how can we train "offline" in World Of Soccer today with what we have easily at hand? Well, for those who are happy owners of the Commodore home computer, original diskettes of the game or even backup copies are easy to find on the usual markets. Even easier-if you have the means-is to write the floppies yourself, starting with the .adf files. You can likewise upload them to pendrive/sdcard is to use them via Gotek reader. In short via real hardware the original SWOS is widely accessible even today. Even - but we will discuss this in more detail next issue - there are offline versions of SWOS with current leagues, formations and statistics, updated to last football season. There is one problem, though. Since some goody-goody has been haggling over such copies, creating a bit of an embarrassment for those who - with the promise that the whole thing was for passion only - had gotten the green light from EA Sports, owners of the brand, the guys in the team dedicated to updates no longer made the .adf file available after the 2019/2020 season. On the Sensiblesoccer.de website - a site that will be our welcome guest in the very next issue - you will therefore find the .hdf version, which is nothing more than a "non-deadable" disk image and which you can easily load via emulator. For example, using FS-UAE, you can from hard disk icon tab load such a file, then run it on an AMIGA 1200 model with 4MB of Fastram. Thus you will get the 2021/2022 season. And, spoiler of spoilers, the 2022/2023 one will be available in a few months!

Serie B championship winner

with the various channels and you manage to settle with all your opponents without too much effort. In addition to this, as I said before, we have two portals where the tournaments take place with lots of ranking, roll of honor, statistics between players... stuff to put the various Fifa and Pes to shame. Let's then tell the truth a bit 'all ... in SWOS we felt like little champions in the days of our youth, so why pass up the opportunity to compete against real opponents in a small micro cosmos tailored to SWOS? In short, if you love the game, you can't not be with us.

Besides players are you also looking for some other kinds of technical help on a voluntary basis?

Regarding help from users... well of course they are always welcome, it is not easy for us to follow all the users we have and manage the whole site. The most valuable hand they can give us is following new members in testing the connection, explaining to them how the site works, how tournaments work, what we do and so on. For us, new users are the most valuable asset and what allows us to survive for years as a community, but unfortunately it is not so easy to find people who actively lend a hand to us on the staff. 90% rightly come to us to play without too much hassle.

Inflated budgets, calcioscommesse, calciopoli, why can those who join your community feel safe with their own company instead?

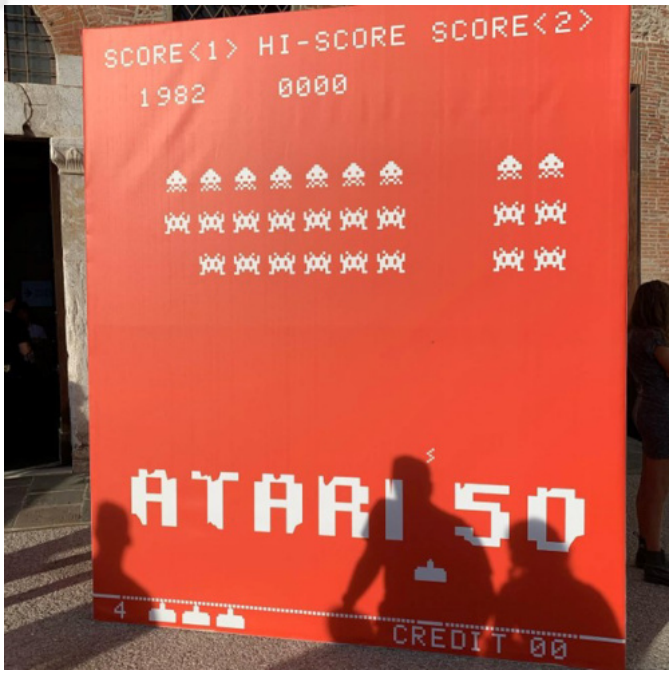
Ahahah no from the big scandals we never had any. Let's just say that our users are all pretty good and have understood the spirit of the site: having fun playing among friends and not bothering them too much. In the past we've had a few smart ones but as they say...we walk them to the door in no time. So those who join our community can rest assured that no one is going to bother them or be smart with cheating and stuff. At our place, the main purpose is to have fun playing SWOS, disconnecting from the real world and the various problems of daily life. For example, one of the things we are overjoyed and proud of was giving a place, during the lockdown due to the pandemic, to so many users who due to isolation found in us a place to stay and have fun, on a daily basis, away from the problems and various menaces of that bad period.

Nolan Bushnell: an ageless innovator

by Simone Camminata and Carlo Nithaiah Del Mar Pirazzini

On a beautiful October weekend that feels like August, at Lucca comics & games the founder of Atari talks about innovation.
A man in his late 80s who moves, talks, is passionate and moved like a little boy and continues to think, create, innovate. What a wonder.
He founded Atari and created the concept of "Videogame" starting with Pong and never stopping, always churning out new ideas and opening numerous start-ups.

He has been a guest speaker at Europe's most important entertainment trade show, is considered one of the 50 men who changed the United States, and he certainly seems unwilling to step aside.
During the press conference he spoke and told us (to the whole group of fans present):
"I have two projects. The first is called Moxy.com. A platform with crypto tokens for smart contect that will aim to create a way by which everyone can challenge each other in "virtual betting."
Suppose, for example, I can beat you at Fortnite. Shall we make a bet? And the bet will be accepted through Moxy, which will create a temporary wallet, scores and at the end, when the challenge is over I will transfer the crypto tokens from the temporary wallet to the winner's wallet."
In short, a wacky but innovative thing that he says will be launched in late November. We'll see.
Ambitious projects include a gamified educational platform called EXODEXA. A platform that will provide comparable education to high schoolers in just six months and with a better retention rate. For now it is available only in



English, but says it will be usable in other idioms as well. He then talked about concretization and how to make it possible to emerge even from nothing.

To do things you have to "Start," he said. "Initially it will suck, but when you introduce yourself to the world, it will respond to you and you have to be there to listen."

"Don't give up if the first project went wrong, the public will tell you why and you can improve next time."

"When I founded Atari we had no money, we had nothing, we didn't even have marketing skills. We had one tool: innovation." That's how Busnelll recounts Atari's 50 years in the beautiful exhibition at San Franceschetto created thanks in part to friends Carlo Santagostino, Antonio Nati and Mike Arcade.

"Atari from the very beginning focused on innovation, emphasized results." Nolan Bushnell also talked about mistakes and how they are important in the journey.

He talked about how it is critical to keep trained in ideas and to always jump in with enthusiasm. He signed autographs, opened booths and viewed cards that he himself was testing, and demonstrated that he is a giant who walks among men with a word for everyone.

He greeted with this sentence, "Do strange things. You will see that your brain is more apt to do just that. And that makes life an adventure to be lived to the fullest."

Japan part 21: live in your world, play in ours

by Michele Ugolini

Dear readers, we have reached the end-of-year holidays. The web is getting organized to celebrate one of the most important video game birthdays in the world: it has already been 28 years since the birth of Paystation 1. We can also call it Playstation X, where "x" meant "Xperimental," personally the most revolutionary experiment in 1994. We can also find it inside the famous "New Horizons" probe: on January 9, 2006, the New Horizons probe was launched by NASA toward Pluto to collect images of the planet. The modified CPU (to withstand space radiation) of the PlayStation1 was used in this probe. A console with undisputed records: we can count more than 4,000 titles. How many demos were created and how many other projects were started, for example, homebrews with Net Yaroze, through this marvel of Japan? How many accessories have been created? So many! These accessories are both joy and pain for us collectors, let's do a quick review of the equipment:

- Simple controller without analog sticks (primitive console controller) (SCPH-1080)
- DualAnalog controller equipped with two analog sticks (SCPH-1180)
- DualShock controller (official with force feedback and analog sticks) (SCPH-1200)
- G-Con 45 (gun that used infrared, only suitable for some games) (SLEH-00012)
- Memory Card (small hardware to be inserted over ports to connect controllers for saving games, essential for completing games) (SCPH-1020)
- Action replay (Unofficial trainer, not compatible with PSone and model 9002)
- Multitap (plug into the appropriate port on the controller and play in more than 2) (SCPH-1070)
- The Glove Control (a glove with keys in the "fingers") (SLEH-00012)
- Mouse (a simple "mouse" with classic PS attachment) (SCPH-1030)
- A link cable to connect two PlayStations simultaneously (used in some games such as Destruction Derby or Duke Nukem: Time to Kill) (SCPH-1040)
- A flightstick used for flight simulators (Ace Combat, Bogey Dead 6, etc.) (SCPH-1110)
- PocketStation (a memory card with LCD display used for some special functions and also used with some games such as Final Fantasy VIII, Crash Bandicoot 3: Warped, R4: Ridge Racer Type 4. Released only in Japan) (SCPH-4000)
- A guitar pick (used in Aerosmith: Quest for Fame, Stolen Song) (SCPH-4010)
- A joypad created by ASCII, Inc. under license from Sony for PlayStation with "Turbo" and "Autofire"

buttons (SLEH-00001)
- An arcade stick created by ASCII, Inc. for fighting games and the like (SLEH-00002)
- Negcon created by Namco under license from Sony for PlayStation, a joypad with the ability to twist clockwise and counterclockwise used to augment reality with driving games (SLEH-00003)
- JogCon created by Namco for PlayStation, with force-feedback (a small wheel used as a steering wheel) (SLEH-0020 / SLPH-00126 / SLUH-00059)
- A "fishing rod" style joypad created by ASCII for fishing games (SLPH-00100)
- Of the joypads created for BeatMania by ASCII under license from Konami and Sony (SLEH-00021/ ASC-05158)
- Mat created by Guillemot/Thrustmaster for PlayStation under Sony license, for Dance Dance Revolution (SLEH-00023)
- A guitar created by KONAMI under license from Sony (RU018-J2)

Hundreds of thousands of consoles were sold worldwide (read my previous articles for more on Sony/Nintendo home marketing). It was December 3, 1994, and in just 30 days Sony sold more than three hundred thousand. Many were convinced that Sony would lose the challenge to Sega and Nintendo as well as their historical characters such as Sonic and Super Mario, but they were all proved wrong by the facts. Ps1 soon entered Europe and the United States in early 1995, immediately becoming the best-selling console of the 32-bit era. Let's review the history for a moment. Who created our beloved Ps1? Our beloved creator's name is Ken Kutaragi. He was an electrical engineer who joined Sony right after graduation (a typical situation in Japan, the best students are contacted well before the school year is over, by numerous firms), in the 1970s. The story goes that his arrival at PlayStation was due to the breaking of an agreement with Nintendo, whereby Sony was to produce a CD Rom unit for the Super Nintendo. It was a revised and corrected version of the SNES, the best-selling 16-bit console, which in addition to cartridges also allowed CDs to be read. The name "PlayStation" had already been defined, but as we know Japanese dynamics often leave too much room for mathematical calculations and little room for the intuition of the famous "sixth sense".At the last moment Nintendo turned its back on Sony and allied with Philips by making the famous CD-i. The project did not pay off and soon ended, the marketing calculations had missed the mark, certainly the layoffs were substantial and painful. In any case, a short time later, the first PlayStation was born. "Revolutionaries at Sony" was a book written by Japanese journalist Reiji Asakura, in which he recounts how Kutaragi's obsession with video games was already well established as well as long before the deal with the Super Mario house. In particular, it was an event that struck Kutaragi and convinced him that video games were the way to go. It was 1984 and Kutaragi, then 34 years old, was in a room at the Sony factory in Atsugi, Japan. In front of him, on a screen, was the face of a human person generated in 3D. By changing some variables , that face could be changed in real time, and Kutaragi, amazed, thought that "it was amazing, I immediately thought that was the future of video games." *That 3D graphics software was meant for television, it was called System G, but Kutaragi was convinced that it would be much more useful for a video game than live TV. As we know Japanese marketing still has very restrictive laws, not only in Nintendo/Sony/Sega.
At that time, unfortunately, the Japanese company considered video games a mere pastime for kids, thus a niche industry worthy of little interest. Kutaragi, however, was far-sighted and convinced Sony to become a supplier to Nintendo, programming the sound chip for the Super Nes himself.
A few years later the great betrayal of the house of Super Mario materialized. For Norio Ohga, the then president of Sony, it was certainly a matter of honor. Nintendo would pay for his "betrayal," and Kutaragi could finally bring the PlayStation project to life: the console designed for the future!
It had a powerful 32-bit processor, Cd Rom drive instead of cartridges, and right from the start it focused everything on 3D graphics.
The result was an unprecedented success. Rivals, the Sega Saturn and the Nintendo 64, were distanced by several million units. The career of the first PlayStation lasted more than eleven years, with 102 million systems sold: the last machine produced was even as late as March 2006, the date of the Ps2's entry as well as the date the probe was launched into space (to this day it is still running and, more importantly, is on its way out of the solar system).
Time passes and the heart of the solar system is now far away (55 U.A.), our star is probably observed as a faint distant light, Ps1 on the other hand is (and forever will remain) a beacon of light in our nostalgic hearts.

Happy birthday Playstation, best wishes to you all from all our staff and our beloved Sony. **Till the next installment!

Zak McKracken, the B-movie game

by Mic the Biker Novarina

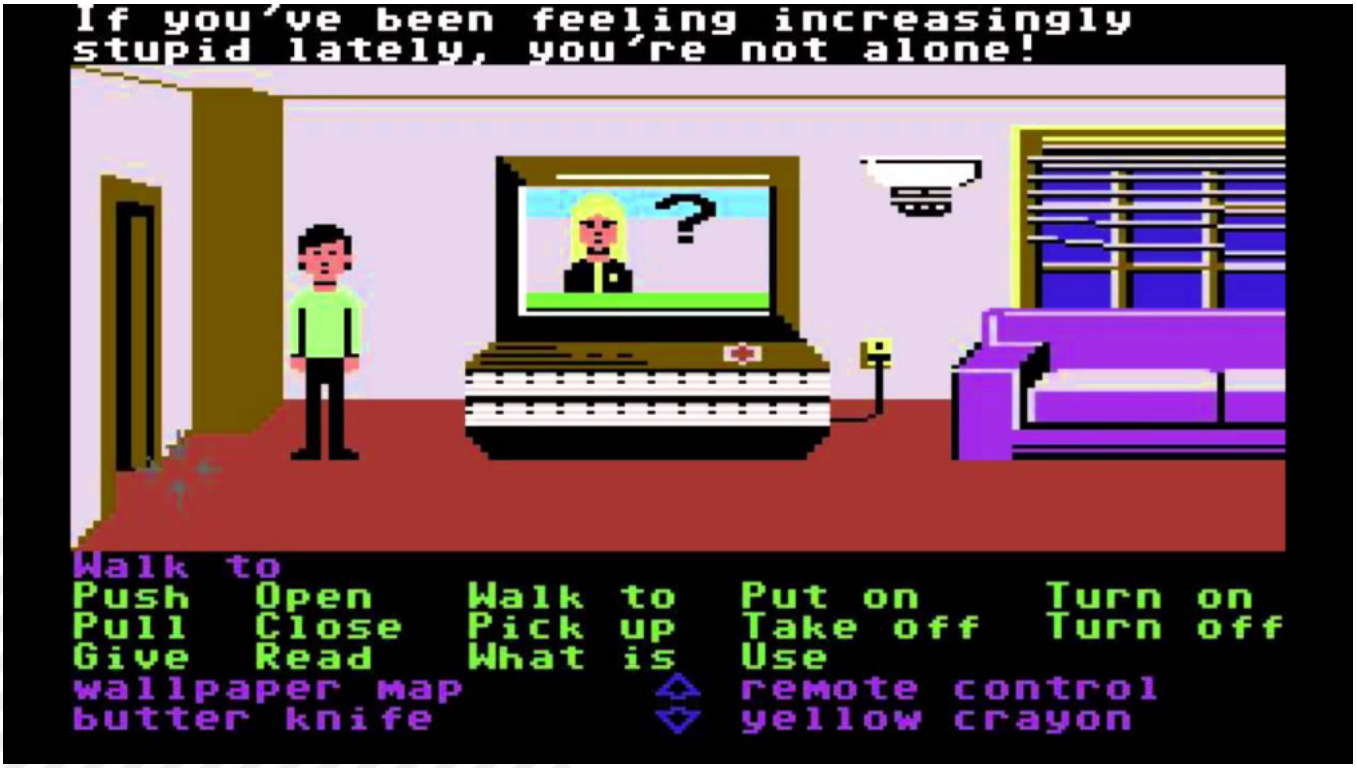
We were left, with our DeLorean, in 1987, lost in that masterpiece that answers to the name Maniac Mansion. We need only take a small leap forward in time and plunge into 1988 to see how the discourse undertaken by the first point-and-click adventure programmed with the SCUMM has evolved.

Zak McKracken and the Alien Mindbenders is, in fact, the second game to use this splendid engine. Like **Maniac Mansion**, the game was initially developed for Commodore 64 and later ported to other systems. First it was ported to PC and the following year to Amiga and Atari ST. David Fox led the development and design of the game, with Matthew Alan Kane as co-designer and co-programmer. Right from the start they wanted to give, the adventure in question, a deeper game atmosphere, so Fox consulted writer David Spangler. Here many aspects and scenes faded into a brilliant New Age bent. The comic and surreal aspect of Maniac Mansion was not to be lost sight of, however. Therefore, even though the game was meant to be more serious, Ron Gilbert insisted on keeping the crazy and genial humor in this chapter as well.

As in Maniac Mansion, the three girls in the game are named after the wives or girlfriends of the programmers. Annie Larris was the maiden name of David Fox's wife, and the character's appearance is inspired by her. Similarly, Leslie Bennett was Leslie Edwards, girlfriend of Matthew Alan Kane, who also worked as a play-tester during the game's production. Each time Leslie's helmet is removed, her hair is a different color. This refers to Leslie Edwards, who changed her hair color virtually every week.

Zak McKracken, the mirror of those years

The game absorbed the stereotypes of that period in the late 1980s. It was inspired by theories about aliens, ancient astronauts, and mysterious civilizations of the past. In 1988 there was no Internet or YouTube, but there was no shortage of books or TV documentaries discussing the mysteries associated with vanished civilizations and how they had managed to create, with the means of the time, true construction miracles. In the game we will therefore find ourselves visiting many pivotal places, such as the pyramids in Egypt and Mexico, Lima and its jungle full of mysteries, and the Neolithic site of Stonehenge. But the ever-present Bermuda Triangle and the Face on Mars, at the time a true stellar enigma, are not left out.


If you've been feeling increasingly stupid lately, you're not alone!
Walk to
Push Open Walk to Put on Turn on
Pull Close Pick up Take off Turn off
Give Read What is Use
wallpaper map
butter knife
remote control
yellow crayon

Human beings have always asked questions: who are we, where do we come from ... but also "will there be anyone up there, in space?" Zak McKracken takes this millennial human question and transposes it with rare skill within the game. Indeed, he manages to go further: aliens are protagonists, along with our characters, in this tightrope adventure. On one side we will find the good guys, namely the Skolarians, while on the other side we will have the Caponids, or Caponians, that is, the villains of the day.

But you know, when we are dealing with a point-and-click adventure from the house of Lucas nothing is random as well as trivial. The good guys have a name that brings to mind the concept of "education" and "intelligence." Obviously there is a reason: they have to counter the process of "imbecilication" of humankind! The bad guys, whose name comes from Al Capone, are a masterpiece of humor and brilliance, with their Cadillac-shaped spaceship and a fanatical leader of Elvis, nicknamed precisely "The King." Simply absolute!

Zak McKracken, the plot

The story is set in 1997, so a full nine years after the game was produced. In those years, the average intelligence level in the world is deteriorating: this is because aliens have built a machine that slowly lowers the IQ of the entire population. Strange life, a game from 1988 has such a present-day and current plot! What could be worse in this grotesque world situation? Obviously that the only person who can stop this diabolical alien plan is a journalist. That's right, not a scientist or a superhero, but a simple when unreliable journalist who invents, for his magazine, the most outlandish stories, writing about vegetarian vampires and a carnivorous cauliflower. His name is Zak McKracken.

The treacherous Caponians have taken control of the famous "Phone Company," a company into which all the world's telephone companies are merged. Through this company they emit a 60 Hz buzz using a "mind-bending machine," with the aim of slowly reducing the intelligence of all Earth's inhabitants (but are you sure the game is not set in 2022?). Fortunately, our Skolarian friends, an ancient alien race, left us humans with a defense mechanism, the infamous "Skolarian Device." Unfortunately, the parts are scattered all over Earth and Mars.

It sounds exactly like another one of the crazy stories of Zak, our reporter with a vivid imagination. But this time it's all true, no hoaxes or fake news. Hardly anyone really believes him except the three people who will accompany him on his mission: Annie, head of an archaeological company, and her friends Leslie and Melissa, who have flown to Mars in a mobile camp. The four of them will have to piece together the parts of this archaic alien machine, unmask the aliens, and destroy the machinery that makes us stupid.

An unexpected journey

And that's where we gang kids come in: we have to play the role of Zak, Annie, Melissa and Leslie and guide them on their unexpected journey. This journey will be full of quirks, humor, craziness and strokes of genius. This point-and-click adventure will take us all over the world, going from the Bermuda Triangle to the jungles of Lima, from Egypt to Mexico, and on to outer space, destination Mars. The adventure is definitely vast and complex, and to help us out we will have to deal with the very useful "Cut Scenes." These are scenes that take place in other places where something important is happening. I remember we were amazed when we first came across them. Until then, never had we felt like we were playing with the plot of a movie! We had already played Maniac Mansion but

here we are on another level of depth and complexity. We are not in a mad scientist's mansion, here our scenery is of a vastness and variety never seen before. Thanks to the SCUMM, the design and input mode are derived from it: in the upper two-thirds of the screen the action takes place, and in the lower third are all the controls.

The puzzles are all quite complicated. Some of them have to be tackled necessarily by using two or more characters together. Many puzzles have several solutions; this makes the game really long-lived. It may happen, for example, to reach the goal in such a way, which may later prove counterproductive. This will force us to start over; therefore, it is advisable to save often during the game. It is nothing frustrating; the level of challenge is exquisitely calibrated. As we progress through the hours of play we realize the importance of the "National Inquisitor." The newspaper our Zak works for hides within it many clues. By reading the contents of the masthead with a certain amount of intelligence one will find many hints to continue in the more complicated parts. Like any self-respecting point-and-click adventure, almost all objects have their own utility. Finally, here we will be able to find the much sought-after tin of chainsaw gasoline, which is "needed for another game." One of the many pearls of humor found within this absolute masterpiece.

Little money in your pocket

Another aspect that makes me think that Zak is set in the present day is the issue of money. They are always scarce and destined to end almost immediately. Fortunately, at least here, this is solvable. I give you an excerpt from the solution to the game for having almost unlimited money, which solves many problems for you.

"Take the flight to Bermuda, and when you are on the alien spaceship, instead of boarding the plane to return to Earth, ring the bell on the right. You will be taken to the leader of the aliens, an avid Elvis fan: give him the guitar and he, in return, will show you the way back to San Francisco. Before entering the code in the teleporter, return to the main room, continue to the right and read the numbers on the LOT'O MATIC. Back in San Francisco you can play them at the junk shop on 14th Avenue and, after a few minutes, you can go and collect your prize. You win so much here that all money problems should be a thing of the past."

Biker's thoughts

Zak McKracken was a so-called aggregator: he had the gift of aggregating us in the Borgo San Paolo Band all together to proceed in the game. Many minds proposed more ideas on how to proceed, but also more cavorting that made our afternoons as fun as ever. Above all, they allowed the many mazes in the game, which were perhaps the only flaw in the whole system, to be less cumbersome. We always wondered whether this was a sequel to Maniac Mansion or not, because the details that tie the two games together are there. Aside from the graphics and the SCUMM, in Maniac Mansion you may remember Weird Ed leaving a message on Zak's answering machine. Then who hasn't noticed the poster advertising Maniac Mansion in Lou's Loans merchandise store in San Francisco? Just as we can see a wanted sign under the name Purple Meteor inside the Friendly Hostel on Mars and in the police office in Kathmandu, Nepal.

A unique game, perhaps the most eclectic of point-and-click graphic adventures. A plot so varied and totalitarian that it represents a chapter unto itself in the history of "SCUMM Adventures." And then what more can be said? A game in which the "words of power" that repair the crystal at Stonehenge, namely Gnik Sisi Vle, are none other than "Elvis is king" spelled backwards, deserves respect. Hat off.

ListAmiga - The 5 (+ bonus) best Soccer games on Amiga from Qatar's World Cup

by Beppe Rinella

Dear friends who, like me after Italy's elimination from the upcoming World Cup, have gone into "Guru meditation," welcome back to a new and bubbly ListAmiga!

The most absurd and nonsensical World Cup in history is now upon us, and the Italian national team, reigning European champions, is a joke that is not even funny and therefore will not take part in the most important football event in the world. Yes, for the second time in a row.

But we don't care about that in the slightest, we turn off the TV, shut down any more or less legitimate streaming platform and turn on our mighty Amigas (not necessarily original eh, no one is a fundamentalist around here!). We do the football-show, and why not start with this small selection of games that I am here to offer you?

A clarification before we begin: I deliberately excluded managerial games in preference to played soccer, in my opinion more appropriate thinking about a competition that runs out in a very short time, as the World Cup is.

We start then with:

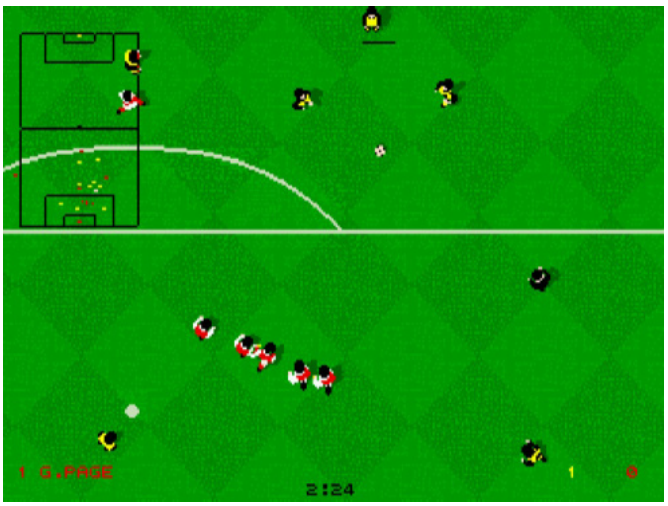
THE 5 (+ BONUS) BEST SOCCER GAMES ON AMIGA FROM THE WORLD CUP IN QATAR

KICK OFF 2

That could easily be enough, what are we talking about? Without any exaggeration, simply a fundamental piece of video game history, not just soccer, not just sports, but absolutely.

Released in 1990, a year after the first episode, Kick Off 2 is one of the best soccer games in history, little to be done.

A brief step back: in 1989 Dino Dini (kudos to his parents for the imagination of the name) decided to completely disrupt the world of video games, particularly those dedicated to soccer, by pulling the revolutionary Kick Off out of his hat. Until then, soccer games involved Velcro being attached to the athletes' feet and the ball, thanks to which the ball remained firmly glued to the players, whatever movement they made. In Kick Off not at all, the ball here went straight on its way, taming it was really a difficult task, in fact it was more a matter of chasing it by making it go where we wanted with a series of touches. Which is what happens in the real world by running ball



Kick Off 2

and foot.

The bird's-eye view, or bird's-eye view if you prefer, allowed a good portion of the field to be seen, plus the presence of radar made it easy to see where we and especially our comrades were.

The pace of play was frantic, the passing mechanism, however, allowed for some reasoning. Holding down the button when the ball was close to our player, one would stop as long as the button remained depressed, thus having the ability to direct the pass and finally release. However, all this had to be done in a very short time, requiring a certain mental and execution speed. This was the feature that I perhaps missed most in Sensible Soccer, where there was no possibility of stopping and reasoning a minimum ball and foot, as happens in real soccer.

With Kick Off 2, the good Dino did nothing but improve every single aspect over its predecessor, as well as introducing a number of noteworthy new features.

The infamous aftertouch already seen in the first Kick Off, i.e., the possibility of imprinting the effect on the ball a moment after shooting, was well present here, now becoming a standard.

The tactical aspect was greatly enriched, never before had we seen such complexity in the management of schemes, we had the possibility of creating customized ones, deciding the position of individual players on the field. All taken by weight from the excellent Player Manager (from which it was possible to import already created tactics), a managerial also born from the mind of Dino Dini.

In short, it was finally possible to create Christmas trees, rhombus midfields, ask wings and full-backs to grind out miles, and anything else that came to mind, including the "Holly&Benji" (or Captain Tsubasa, if you prefer) deployment, i.e., "get the ball and always go straight, crosses don't exist." Technically basic but not for that reason poor, the proportions between the size of the small players and the field were absolutely spot on, unlike what was usually seen in more arcade titles, everything was perfectly functional to the game. The sound, on the other hand, did the bare minimum.

A timeless masterpiece and a lesson in programming that still impresses today and puts decidedly newer titles in line.

Sensible World of Soccer 96/97

SENSIBLE WORLD OF SOCCER 96/97

Lovers of soccer games on the Amiga have always divided into two distinct factions: Kick Off 2 or Sensible Soccer.

I have previously stated my affiliation with the Sensible Soccer faction, to date the title I have played the most in my life. This tendency of mine has never prevented me from recognizing the tremendous value of Kick Off 2 of course, without the existence of Dino Dini probably Sensible Boys Soccer would never have existed, so thanks again Dino!

Coming to us, Sensible World of Soccer 96/97 (henceforth SWOS) is the best version among the many releases.

The first version of Sensible Soccer, without the "World of" in between, came out in 1992, then a couple of updates with some minor improvements, but it was in 1994 that the first version of SWOS saw the light of day. This was obviously not a mere name change, that "World of" was not random at all and really encompassed quite a lot.

The biggest introduction in SWOS was the career mode, which we could deal with as just players, worrying "only" about taking the field, as a manager, so no field but team management, including soccer market, or both.

Buying and selling players was time-consuming, getting lost in the endless database of leagues, teams and players was very easy indeed, scouting literally all over the world in search of the unknown talent was exciting, and sharing our new discovery with friends was a source of enormous pride.

The tactical aspect had been significantly deepened, with the ability to create quite elaborate schemes and tactics, deciding the position of each individual player based on where on the field the ball was.

At the end of the season then came offers from other clubs requesting our services, including national teams. The better our season had been, the better companies and national teams were interested in us.

Graphically, SWOS is minimalist to say the least, with tiny players and rather poor animation, but it's all pretty damn perfect. The top-down view, a few feet higher than in Kick Off, meant that the portion of the field visible was really large, so much so that the presence of the radar present in Kick Off was unnecessary.

In the course of the match it was possible to hear the constant buzz of the audience, choruses, boos following a save or an ejection, as well as, of course, cheers after a goal, the sound effects were within the norm.

SWOS was perhaps less realistic than Kick Off 2, leaning decidedly more on immediacy and doing it great. It was the classic game that was simple to play but required a lot of practice to master properly, turning out to be more complex than it appeared. Playing SWOS was tremendously fun and still is, the risk of addiction then is very high.

A timeless masterpiece, in the true sense of the word being alive and well to this day thanks to annual updates. Wonderful.

GOAL!

It is spelled Goal! but it is read Kick Off 3.

Having abandoned Anco, for Dino Dini the name "Kick Off" was no longer usable and he therefore called his new work Goal!, he loved simple names in short.

Anco then a Kick Off 3 published it, but it can be safely classified as garbage.

Goal! improved Kick Off 2 in every respect, and it was by no means easy.

The graphical aspect was markedly improved, with larger and well animated players, they appeared quite stocky

and definitely sturdy, I always appreciated them very much. There were two views available, one closer than in Kick Off and the other more like Sensible Soccer, perhaps a bit "farther away." Unless you chose to want to use only one of the two, the computer used both. Narrower view during action, wider view for spot kicks and throw-ins. Also it was possible to change the orientation of the field, arranging it horizontally and not just vertically, personally I always found it alienating preferring the classic arrangement.

A new mode for taking penalties and corner kicks was introduced; a dotted line appeared in front of the player in charge of taking the penalty, allowing the angle, force and trajectory of the shot or cross to be determined.

Interesting were the replay functions, which allowed people to review their goals, rewind and replay in slow motion, as well as being able to save them to disk.

For the first time in a Dino Dini game, the names of the players were real and each had a rich list of statistics and parameters, with about 3000 players available this was undoubtedly a great job.

The available competitions were not many and nothing official, it was possible to create your own league including a maximum of 32 teams, while in the arcade mode you faced five teams with increasing level of difficulty, finally the classic friendly matches. No cup, a curious and quite inexplicable choice. A small remark about the interface of the different menus: definitely spartan with all those square blocks, I always loved it!

Goal! is really a Mr. soccer game, fast-paced, frantic but with which you can baste really articulate and satisfying game plots. It is perhaps the title that most of all gave me the feeling of playing soccer. It is not easy to master, it requires practice and dedication that pay off, however, very well

Goal!

The comparison with Sensible Soccer is inevitable, but they are very different games, so different that they are perhaps complementary; of the two, Goal! definitely leans more toward simulation.

Goal! is an essential title that absolutely cannot be missed by anyone who loves soccer.

SIERRA SOCCER

I have always loved Sierra Soccer, despite the fact that it is certainly not the best soccer game available on the Amiga and indeed, has quite a few flaws.

When it came out in 1994, at the height of World Cup fever in the U.S., the time I theoretically should have spent studying for the arduous eighth grade exam dropped dramatically because of Sierra Soccer.

The game modes that this title offered were rather paltry: friendly, cup, penalty training and penalty kicks. The cup involved a choice between random rounds or those of the official world cup to be played shortly thereafter, a maximum of 8 players could take part in the competition, each choosing their own team.

Of official licenses there was no trace, the names of the players were all comically mispronounced, in Italy for example played the likes of Maldeeni, Beraisi, Senyori and the great Roberto Bajhio, who would still be infinitely better than the current nationals. There was nothing customizable; on the other hand, it was possible to create your own team from scratch.

Graphically Sierra Soccer was not bad at all, the players were small but had a good number of well-crafted animations. The special features were the field and the visuals. Both of these aspects were reminiscent of Striker, which came out a couple of years earlier. The field was three-dimensional and the view was not perpendicular to the field or nearly so as in Sensible Soccer, but more or less at 45 degrees, more behind the players let's say. The small size of the players still allowed for a very good view of the field, plus from this position everything was in perspective, so with the farthest goal being smaller in size than the closest one and no penalty areas with perfectly right angles.

Unlike the games covered so far, Sierra Soccer was distinctly arcade, the ball staying perfectly attached to players allowing for resounding slaloms between opponents and sudden changes of direction, all without the ball ever

Sierra Soccer

leaving our feet.

Perhaps the most annoying flaw was the assignment of the controlled player in the defensive phase. In practice the computer decided when and which player was controlled by us, which often did not work very well. Often we would find ourselves chasing the opponent with the ball, getting close to him by now, but suddenly losing control of our player in favor of a more distant teammate. Quite a frustrating flaw, but after a while we would learn to understand how the computer "reasoned" and thus predict which player we would control and when.

What has been said so far certainly does not suggest a great game, Sierra Soccer in fact was far from perfect. Nevertheless, it was damn entertaining, having the ball always firmly at our feet allowed us not to worry about having to chase it, allowing us to build up even quite complex actions. The goals scored in Sierra Soccer could be highly spectacular and not unexciting; the satisfaction of firing a shot from outside the box that goes straight into the crossbar, with the diving goalkeeper unable to do anything, gave no small amount of satisfaction.

Sierra Soccer was a game with no pretense of wanting to be the best in the business; compared to Sensible Soccer and Goal! it played a different league, just to use a metaphor in theme.

It was immediate, fun, almost essential, and unabashedly arcade-like and gave me and others several months of pure enjoyment.

EUROPEAN CHAMPIONS

Released in Italy as "Retee 2!" and in Germany as "Lothar Matthaeus Die Soccer," European Champions (EC) was an excellent soccer game, in some cases not too well received by critics or at any rate not as it would have, in my opinion, deserved.

Again, just as in Sierra Soccer, the focus was definitely more on the arcade aspect than on simulation as was the case in Kick Off and Sons. So ball firmly attached to your feet and off you go. Despite this, however, the innovative passing system that CE introduced made the game definitely deep and allowed the construction of really spectacular actions.

It was possible to make passes in several ways, starting with the simplest one, an arrow would appear on the player with the ball indicating which player we would throw the ball toward. As the ball traveled from one player to the other, pressing the button again would cause the recipient of the ball to pass or shoot, depending on where he was, of first intent. In this case both the player to pass to and the action taken by the recipient were determined by the computer, based on our position on the field and that of our teammates, initially giving the impression that what was happening on the field was not really our doing. But this was not the case; once the mechanism was assimilated and with a little practice it was possible to create choral actions with really exciting touches from the front. Another possibility was to hold down the button, an arrow would appear in front of our player and we could direct the pass where we wanted by moving the arrow at that point, the longer it was held down the longer the pass was. Finally there was the option of passing by directly selecting the receiver, the ball-and-foot player would continue his run while we chose who to direct the pass to. The latter was perhaps the least practical mode but with a little practice it was really interesting.

The control system therefore was not as simple as was

European Champions

usually the case in arcade games and required a good deal of practice, but once mastered one appreciated its versatility as well as its originality.

It was possible to play EC using two different views, interchangeable even while the game was in progress, the top view but definitely narrower than in Sensible Soccer, and the side view, in my opinion the best view and one that allowed more appreciation of the good workmanship of players and animations.

The sound was certainly not EC's strong point, I particularly remember the trumpets that could be heard during the game, which were quite ridiculous.

EC offers all the classic game modes, so there is no shortage of cups, leagues and friendly matches. And again, creation of custom tactics, possibility to customize teams and players by acting on the many parameters present.

In short, EC really offered everything a soccer fan could want, was rich in options and customizations, and once familiar with the control system became as exhilarating as few.

If you happen to discuss soccer titles on the Amiga you may not hear EC mentioned often and this is in my opinion deeply unfair, it is an excellent title that attempted to introduce really new mechanics distinguishing itself from its competitors and did so with excellent results.

If you have not yet done so, it is a must to catch up.

SOCCER KID (BONUS)

The reason for that BONUS is obvious, putting a platformer in a list dedicated to soccer games doesn't make much sense, in this case, however, soccer still has a lot to do with it.

The year Soccer Kid was released was always 1994, and the intention was evidently to capitalize on the anticipation of the USA 94 World Cup. Krisalis decided to capitalize on the growing World Cup excitement with a beautifully crafted platformer.

The story was simple and sufficiently absurd: aliens, collectors of trophies from other planets, decide to take possession of the world cup. While being transported on their spaceship, via the classic alien beam that transports things on spaceships, an asteroid hits the cup breaking it into 5 pieces that fall back to Earth, each in a different country.

Our task, as Soccer Kid, was to retrieve the five pieces of the cup scattered across England, Italy, Russia, Japan and the USA. Each level was divided into three sections,

Soccer Kid

and at the end of each there was the classic and unfailing boss to face.

The special feature of this title was the only weapon we had, which was our trusty soccer ball. The protagonist with the ball had a way with it and used all his best shots on offense. We could hit our opponents with shots, headers, backhands and much more. The ball was then also usable as a trampoline to take remarkable leaps and reach otherwise inaccessible points. In the course of our adventure we also had to collect soccer player stickers scattered around the levels, eleven of each, and completing the collection gave access to bonus levels.

Soccer Kid is graphically delightful, starting with the animation-rich protagonist, everything is beautifully realized. The different countries are excellently realized and recognizable, with distinctive settings and themed enemies. The music also does a great job, different for each setting and very pleasant.

Perfect scrolling without the slightest uncertainty completes a work of sublime quality.

Soccer Kid is an excellent platformer, among the best on the Amiga and with the great merit of introducing something really original that makes it unique compared to competitors in the same genre, all this by introducing "only" the use of a ball, not bad indeed.

Long, varied, and moderately challenging, Soccer Kid is a joy to play and is a great diversion between a game of Sensible Soccer and one of Goal! while still staying within the soccer theme. Delicious.

Our beloved Amiga really has a lot to offer when it comes to kicking a ball around, come visit us on our social channels and let us know what your favorite games are!

Greetings to all of you and AMIGA FOREVER!

RM Console

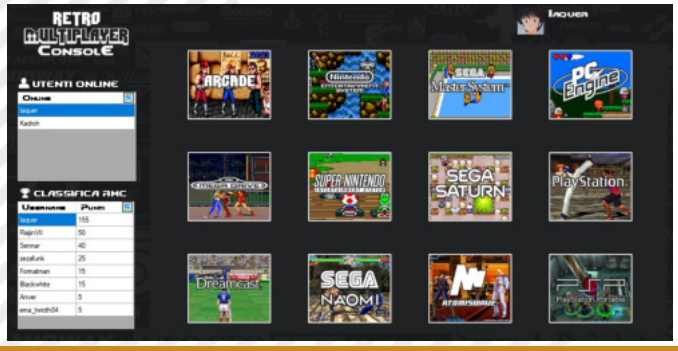
by Querino Ialongo

Christmas is here, and we video game lovers are very attached to this time because as children we always hoped to find our favorite console under the tree.
To recreate a bit of that magical atmosphere, the admins of Retro Multiplayer thought of a beautiful gift for their users and thus gave birth to the RM Console, a front end with which you can play our beloved retrogames.

Actually, the RM Console was already born several months ago, but it initially relied on third-party programs adapted as much as possible in style and graphics.
Instead, this latest version is basically software created and designed from scratch, the result of several months of work and testing.

Inside the RM Console run free front ends that emulate retrogames, such as Retroarch, Flycast or Mednafen, but they have been completely simplified in settings and adapted to a new GUI.

The Rm Console respects what are the principles of the Retro Multiplayer community and in fact aims to emulate those titles that can be played cooperatively or in versus, to recreate the beautiful spirit of arcades or afternoons spent together at friends' houses.
A variety of content can be emulated with the RM Console,



from arcade classics to 8-bit consoles such as Nes and Master System, from 16-bit consoles such as Megadrive and Snes to the beloved Ps1 and Dreamcast.

But this new front end is not just limited to emulation because inside it has two sections with which users can challenge each other and have fun together.

The first one is called Versus and, as you might guess from the name, it is a 1vs1 challenge between two users who have to choose a title from three different categories; fighting, sports and puzzle.

The second section is called Highscore, and users will be able to upload to the console a screenshot of their best score of a title that will be chosen from time to time.
Winners and participants in these challenges will receive points to climb the Retro Multiplayer Championship leaderboard, i.e., an actual arcade championship that will award winners with final prizes.

Giochi
1941 - Counter Attack (900227 ...
1943_ The Battle of Midway (Eur...
1944 - The Loop Master (000620 ...
3 Count Bout _ Fire Suplex (NG...
64th. Street - A Detective Story...
Action Hollywood
Aero Fighters (World)
Aero Fighters 2 _ Sonic Wings 2
Aero Fighters 3 _ Sonic Wings 3
Age Of Heroes - Sikroad 2 (v0...
Aggressors of Dark Kombat _ T...
Air Assault (World)
Air Gallet (Europe)
Alien Storm (set 3, World, 3 Pla...
Alien Syndrome (set 4, System 16...
Alien vs Predator (940520 Euro)
Aliens (World set 1)
Alligator Hunt (unprotected, set ...
Altered Beast (set 8, 8751 317-0...
Andro Dunos (NGM-049)(NGH-0...
Arabian Fight (World)
Arabian Magic (Ver 1.0A 1992_0...
Armored Warriors (941024 Euro...
Ashura Blaster (World)
Asterix (ver EAD)
AERO FIGHTERS
INSERT COIN!
INSERT COIN!
INSERT COIN!

We are sure retrogame lovers will love this front end so the invitation is to join the Retro Multiplayer discord server, first to find a community of friends and fans, but then also to play together with the RM Console.

The game room reopens; many evenings of pure fun await us.

NEW GAME

NONE OF US

Year: 2022
Editor: Electric Black Sheep
Genre: Shoot em up
Platform: Amiga
Website: https://electricblacksheep.itch.io/none-of-us

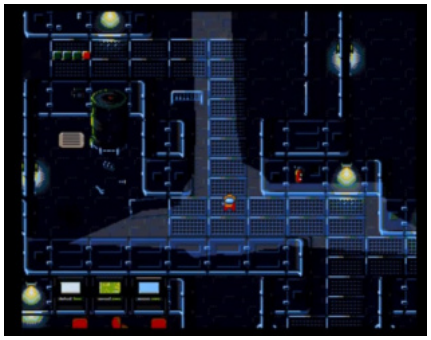
We are looking at a pure action title made by those geniuses at Electric Black Sheep. A top-down adventure/shooter that boasts an art style inspired by the popular multiplayer game Among Us.

Players must try to escape from a ship full of enemies in a setting with limited visibility.

Compared to the title from which it takes inspiration, None of Us features a different type of gameplay that is more pure action-oriented and at times reminiscent of Chaos Engine.

Armed with laser blasters, players will navigate a lab-ship, unaware of who or what is on board.
Among Us is an independent multiplayer title that has gained great popularity in recent years. Everyone from celebrities to influencers to gamers have joined the action, propelling it to commercial success.

So here comes None of Us, a prototype version, a joke that takes the visual design and inspiration from the aforementioned game.
Basically, you can think of this title as a top-view shooter with retro pixel graphics and a Among Us skin. The main objective is to escape from the ship and eliminate every single living

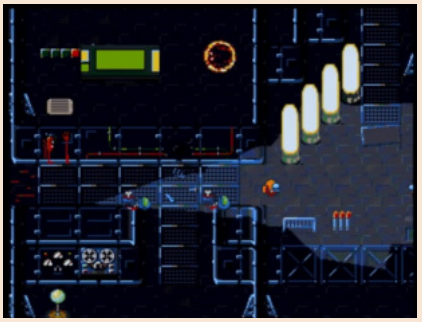


thing present.
Armed with laser blasters, exploring interconnected areas and destroying everything that moves.
To provide a greater challenge, our view will be compromised and limited to our sight. This makes confrontations with enemies more varied and unpredictable.

And it is simply an experiment by Electric Black Sheep. A joke that shows the functionality of the game engine and the fluidity of the motion graphics. However, it is a fun and highly playable joke capable of nailing us in front of the joystick to tackle the next level.

If you liked Among Us, then None of Us is a fun little inspired shooter worth trying. Visually it is similar, but its gameplay is definitely more Fast, Furious And Funny and geared toward action and destruction.

by **Giampaolo Moraschi**



OUR FINAL SCORE

» Gameplay 85%
Inspired by Among Us with old-school shooter gameplay and great interconnectedness. Too bad it's a prototype and not a full title.

» Longevity 90%
Glues you to the joystick.

NEW GAME

DEVIL'S TEMPLE:

SON OF THE KUNG FU MASTER

Year: 2022
Editor: Geezer Games
Genre: Beat em up
Platform: Amiga
Website: https://mcgeezer.itch.io/kung-fu-remaster

Devil's Tempe is a spin-off of the arcade classic Kung Fu Master. With 10 levels and 3 bonus levels, we will play the role of Tommy (son of the Kung Fu Master) in a rescue adventure through the Devil's temple. Again, as in a thousand other similar titles, we will have to free our girl from the terrible X.

Each level features a boss fight and a lot of secret bonus items to discover that will give us extra lives, extra health and weapons.

The game requires at least an Amiga 500 with 0.5 Md of slow Ram to run. When it comes to pure old-school arcade action, Devil's Temple is as close to perfection as you can get. Wonderful-looking graphics, a pumped-up, well-crafted soundtrack, and compelling gameplay blend well enough to make it a modern masterpiece for the Amiga.

The group at Geezer Games decided to embark on a project that turned out to be much more than just an arcade porting of the original title. The art style of the title is perfect. Not only does it look beautiful, but it is highly detailed and awash in 80s references (yes the title is set in 1987). Everything moves very well and some collision errors between sprites present

in the first version available for purchase have been corrected.
When it comes to the actual game play, I found it challenging and fun at the same time. Devil's Temple doesn't necessarily contain as much variation within its style (in the same way as its inspirational predecessor) but it is executed so well and part of that is due to the fact that each level is just the right length and never tires. The title is available for a fee as a digital download (initially deemed too high and now scaled back in cost) but a physical version of the title will be available for purchase soon.

If you are looking for a good modern scrolling fighting game Devil's Temple is for you.

by **Carlo Nithaiah Del Mar Pirazzini**

OUR FINAL SCORE

» Gameplay 90%
Beating up bad guys with kung fu is always fun. Simple and effective.

» Longevity 90%
A title that is well calibrated in difficulty and will keep you busy for a while.

ADVANCED BUSTERHAWK GLEY LANCER

Year: 1992/2022
Editor: Masaya/Retro-Bit
Genre: Shoot em up
Platform: Sega Megadrive
Website: https://retro-bit.com/gley-lancer

Released in 1992 by Masaya for Sega Megadrive only for the Japanese market, Gley Lancer remained confined to the Rising Sun for a long time, until it was launched in 2008 for the Nintendo Wii Virtual Console and then for Ps4 and Ps5.
A sumptuous title that, after exactly 30 years, returns in a physical version on our beloved Megadrives.
It is a shoot em up with horizontal scrolling and is definitely a great game worth trying your hand at.

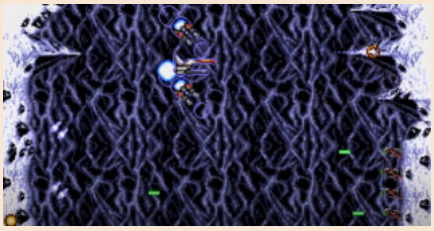
Technically, even today the graphics look incredible with lots of enemies on screen, parallax backdrops and no slowdowns.
A game developed with knowledge of the Sega console by the Masaya team and peppered with a great soundtrack.

Once you press start (after popping into the options section if you feel like it) you can choose how to configure your spacecraft's firing set-up. Each type of choice is perfectly suited to the waves of enemies in a given level. The armaments are the strong point of this title, just as they were in R-Type for example, and depending on the upgrades and the type of fire chosen will result in different effects that will give a certain type of character and customization to the ship allowing the player to calibrate, game after game, the right set to be able to tackle the game.

It is a title from the "old world," when there were few continuations, no save states, and tutorials were unthinkable. It's a game that requires precision, reflexes, and a keen eye, simple to learn but damn punishing if you miss even a simple trajectory.

If you love the genre and want to try something different and never seen before, I recommend you rush out and buy this title.

by **Carlo Nithaiah Del Mar Pirazzini**



OUR FINAL SCORE

» Gameplay 90%
Plenty of combinations for your spaceship and really interesting level design.

» Longevity 80%
It is not a title for everyone and is part of that "old world" that might turn away casual gamers.

KIDOU SOUKON DION

Year: 1992

Editor: Vic Tokai/Jorudan

Genre: Shoot em up

Platform: Super Nintendo

I'm pretty sure all of us old-guard players have been faced with this situation in the past.

We would go to our local store to find out what was new for that weekend. Complete with pocket money from our relatives in our wallets. Arriving we would discover that many titles were not even available and were left with questionable options in the choice. Kidou Soukon Daion was one such option. Reviews at the time had not been lenient with the game or even the graphics of the U.S. version and the new name (Imperium).

Despite my curiosity I always left it on the shelf until one day I decided to buy it (also thanks to a mega discount from the retailer at the time). But is it really that bad in the end? No, but it is also not an absolute masterpiece.

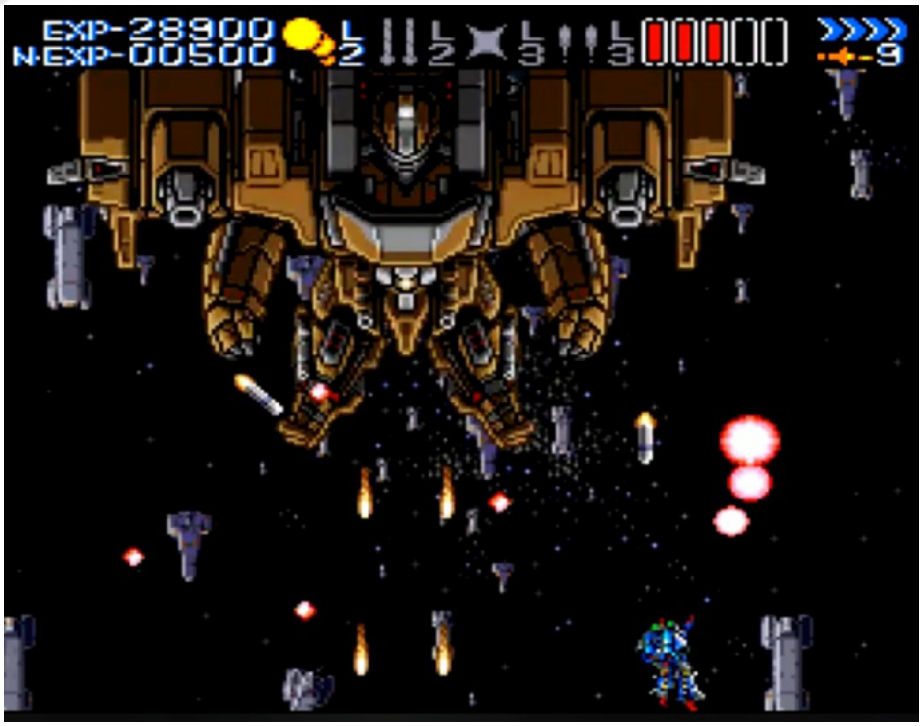
Set as one of the titles in the Aleste series, the game features a design very much in vogue at the time. There are the giant robots, a thousand on-screen enemies, the planet to save--everything you must have in an early 90s shooter.

There are the possible weapons and various combinations and even the classic smart bomb level wipe. The game uses a strange but nice experience accumulation system to upgrade weapons, and this is particularly welcome at least curious. It is very similar to Radiant Silvergun in this sense, though not as deep. Each weapon has three levels and changes rather drastically starting from a measly shot to blasts that take up almost the entire screen.

Leveling up as in a role-playing game is a feature that I thought was

innovative and that I appreciated at the time and still appreciate now.

One of the main problems with the game is in the programming. There is a ton of stuff on the screen at times and often the poor Snes struggles to move everything decently causing deadly slowdowns and quite long in terms of gameplay. Reminiscent of Super R-Type slowdowns but much



onger and more annoying. Another downside is the last three levels of the game. After magnificent and detailed landscapes, these last three are basically set in sidereal space. There is a lack of variety except in the final boss battles.

The pace of the game is relentless and quite varied. Intense I would say. Perhaps an additional drawback goes to the management of our ship's energy. Not having multiple lives but only this bar would have been useful to restore it with some power ups, but this only happens if you level up. If you can maximize the weapon to the best, the situation is less lethal, otherwise game over is always around the corner.

One life and limited continues affect the longevity curve in no small way. Completing the game in different difficulty modes shows different endings, and the one at hard level is the actual ending.

Vic Tokai has made a shooter with powerful graphics and a beautiful soundtrack but with obvious programming issues and strange difficulty handling.

There are better games to choose from on Snes.

by **Roberto Del Mar Pirazzini**

OUR FINAL SCORE

» Gameplay 60%

The game's poor optimization skills make some places chaotic and difficult to deal with. Commendable experience system but bad level design in some places.

» Longevity 60%

Not too balanced. A proper "life" system would have improved the experience.

NEW GAME

STAR FOX EX

Year: 2022
Editor: SF Team/Nintendo
Genre: Shoot em up
Platform: Super Nintendo
Website: https://www.romhacking.net/hacks/7285/

Fox McCloud faces his toughest challenge yet: saving the Lylat System from... Mario and Luigi!

Star Fox EX, the most advanced mod ever created for Star Fox, is now available.

This is an exciting project in development for over two years that completely revamps the game through new features, a new map, new levels, crazy new enemies, a new soundtrack and more.

"The Mario Bros. have decided that Nintendo's Star Fox francise no longer has a place within the vast gaming universe," reads the wacky but somewhat plausible description of the mod, "and have decided to destroy the Lylat system forever with the help of Nintendo's most successful IP characters! Will Fox and his team be able to put aside their previous friendship with the Nintendo All Stars to save the system and everything associated with the francise?"

Yes kids, Mario is in Star Fox EX, along with Luigi, floating Link heads, Metroid and other Nintendo intellectual properties that will surely raise the wrath of the game maker should this mod achieve sufficient popularity. Star Fox EX (which stands for

OUR FINAL SCORE

» Gameplay 95%
The original Star Fox is a masterpiece in depth, level design and plot. This title takes all that is good and multiplies it with a thousand outstanding modifications.

» Longevity 95%
Fun and definitely addictive. The absurd story and the desire to discover all the new features in the mod glue to the joypad.

Exploration Showcase) presents a new map of the Lylat System with 17 worlds to explore.
It is possible to customize almost everything in this title. You can change the game views, add a wireframe mode, modify your ship, and even customize the crosshairs.

All of these new features can be configured as part of a three-page menu at the beginning of the game that also includes "GOD" difficulty, "Ridiculous" speed, and "DARKNESS" mode.

Starf Fox EX supports up to five players, both human and AI. Mod creator Kando assures us that tons of secrets are also hidden.

We can call this modified title a better sequel to the original title. Better even than that Star Fox 2 that came a few years ago with the Mini Snes.

We recommend downloading the mod and testing it on a US rom.

It is worth it.

by **Carlo Nithaiah Del Mar Pirazzini**

NEW GAME

NEW JOE & MAC: CAVEMAN NINJA

Year: 2022

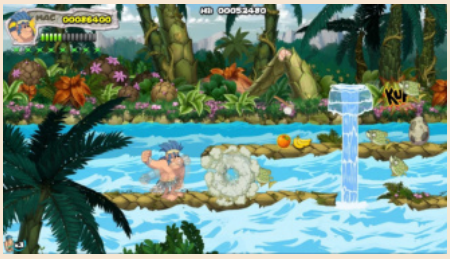
Editor: Microids/Mr. Nutz

Genre: Platform

Platform: Steam, PS4, PS5, Xbox One, Xbox Series S/X, Nintendo Switch

Who knew that Microids, a software house behind the Syberia franchise and a ton of "shovelware" games, would eventually become one of the pioneers in reviving old titles from the past for a new audience.
Sure, they are not at the level of the DOTEMU guys (the guys behind the new Turtles or Wonderboy), but between a new Arkanoid, an upcoming sequel to Flashback, and the revival of Toki, they have done appreciable works.

The effort is worthy of praise; their attempt to revive the saga of the two cavemen is commendable.
For the uninitiated, Joe & Mac is a platforming franchise originated for arcades by Data East in the early 1990s. It stars two sinewy primitive men armed with clubs on their journey to rescue their respective girlfriends who have been kidnapped by a rival tribe. In making this rescue they must contend with numerous angry brutes, dinosaurs, and a crippling hunger that causes them to lose health points just by existing (recoverable by consuming the bountiful meals released by enemies). This games were the typical arcade platformers of the time, created by people who



thought Ghost n' Goblins was a relaxing experience. Well yes gentlemen, the game was a particularly tough title for the time and definitely a money-eating machine that made people entertain themselves and want to insert one token after another.

New Joe & Mac is the same thing, only with some new visual elements and a new mode, which is just a series of new levels that keep the same gameplay loop. You either love it or hate it.
Microids and in-house developer Mr. Nutz (let's see who remembers what he is) have stayed true to the roots of the series in a surprising way. It's still a tough title, with waves of enemies to disturb us and the hunger meter dropping relentlessly.

The name of the game is supposed to be "try and repeat," New Joe & Mac wants you to constantly repeat levels, to face enemies and their unfair mechanisms in order to succeed. A mechanic this undoubtedly a child of the past that will make first-time players turn their noses up at it in no small part. Real advantages? The two-player mode that makes our tortuous journey a little easier.

What sets this game apart is its presentation, not its gameplay (dated by design). It retains the same cartoony art style also seen in the excellent Asterix & Obelix: Slap them All, albeit with a lower level of care. Some animations are shaky and the game is subject to a drastic drop in framerate (in this it is again reminiscent of the original title). That said, it is still pleasing to the eye. The soundtrack is ... how should I put it ... on the side. It's there but I can't remember if it impressed me. But that is not a problem; the original title did not have a memorable soundtrack either.

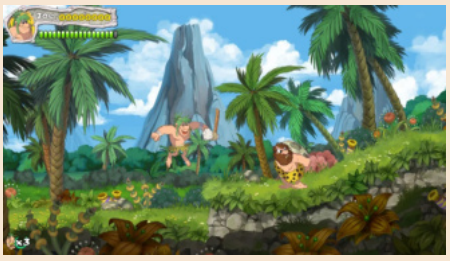
Personally, it reminded me a lot of Ghost 'n Goblins Resurrection. It has its audience of arcade platformer fans who will be attracted to the graphics and that "old school" style of gameplay, but in the end it is a brutal and often unfair game, filled to the brim with difficulty-increasing mechanics implemented in an odd order to prolong the title's duration. It has its charms, I won't lie, but the personally my rating doesn't go beyond sufficiency.

by **Roberto Del Mar Pirazzini**

OUR FINAL SCORE

» Gameplay 65%
It is easy to control, but not the most intuitive of platfroms. The character is slow, fragile, and constantly losing health. Mechanics suitable for a coin-operated title.

» Longevity 60%
A product tailored for an audience that likes unfair S&M like platformers designed to be replayed. Not recommended for a younger audience. The dual version is fun.



NEW GAME

TURRICAN II AGA

Year: 2022
Developer: Sonic Sloth
Genre: Shoot em up/Platform
Platform: Amiga AGA
Website: https://sonicslothgames.itch.io/turrican2aga

An unexpected gift for all Amiga AGA owners (and not only them).
The conversion of the PC-DOS version of Turrican II is finally available for free and online.

A Christmas gift Sonic Sloth gives to all of us nostalgic gamers, and it also does so thanks to the approval of the Factor 5 who approved the development on the condition that the game would be distributed for free.

The Turrican saga was for the Commodore 64 first and the Amiga later a workhorse. It served to show friends how powerful, thunderous and tasty there could be in a game.
Converted to almost all platforms of the time, the Amiga AGA lacked the port of the PC-DOS version.

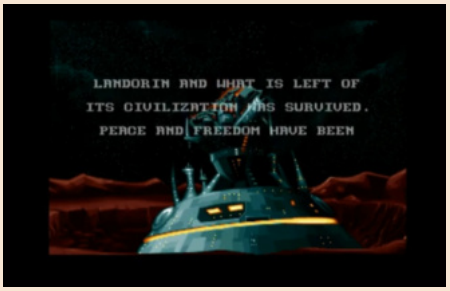
And here it is. It has everything and there is more!
We have all the enemies and bosses and all the levels. The AGA chipset was exploited and the whole title reprogrammed from scratch.
Chris Hulsbeck's beautiful score and sound effects were left behind.

Several interesting options have been added: we start with three additional difficulty modes, the built-in tranier, the option to replace the protagonist's sprite from the DOS model to the AMIGA model, improved Gyro Jump controls, and support for 2-button joysticks, CD32 joypads, and the ability to redefine the controls at will.

OUR FINAL SCORE

» Gameplay 95%
It is Turrican. Nothing more needs to be said.

» Longevity 95%
Have I already told you that it is Turrican?



They added the ability to look down to see blind jumps (very useful) and improved the graphics of the DOS version by reintroducing parallax in missing levels, some animations, and graphic effects.
It is full of secret bonuses and small easter eggs.

How will it run?
Once you download the file you will find a lot of "flab" inside.
There are two adf versions (Pal and Ntsc) to play on real machines, a version specifically for A500mini, and the install WHDLoad.

On classic AGA (1200/4000/CD32) it works well with 2 MB Ram in floppy version. It requires 8Mb of Fast if we want to work on WHDLOAD.
In emulation of course it works as you see fit, since you can configure everything and customize it as you see fit.

The Pal version runs 50fps and runs as perfect as the original. The NTSC version runs slightly faster and often slows down at some points where the action is more concussive. The author has already said he will get his hands on future releases to fix the problems.

We tested the game in emulation, on a500 MINI and on an A1200. All times it ran smoothly. It is still a damn fun game and difficult to master if you are not handy.

Dear Amiga owners, rush out and download (and maybe support with a small donation) this title. It's video game history, and it's a kick-ass release.

Now we are waiting for the MSX version that is under development!!!

by **Carlo Nithaiah Del Mar Pirazzini**

NEW GAME

BOSCONIAN

Year: 2022
Developer: Shanti77
Genre: Shoot em up
Platform: Atari XL/XE
Website: https://forums.atariage.com/topic/254670-bosconian-for-the-8-bits

Bosconian is part of arcade history. It was made in 1981 by Namco in Japan and distributed and produced in the US by Midway Games.

The goal of the game is to earn as many points as possible by destroying everything that appears on the screen: enemy missiles, spaceships, space bases, asteroids and company.

To do this we will use a beautiful spacecraft that fires both front and rear.

Bosconian is the first game of its kind to feature diagonal movement.

It was successful in Japan and received a positive reception from critics, but was not as successful in the rest of the world compared to other shooters of the Golden Age of arcade games.

The game was converted for some home systems such as the Sharp X68000 and on Msx, received a sequel

in 89 called Blast Off and one in 1990 called Final Blaster.

Critics later recalled the title as one of the most influential shooters ever. This version for Atari 8Bit is beautiful. Well made, with excellent game controls and the appeal of the original game.

In the final 2022 release, speed has been increased and the navigation angle corrected, a new look has been added to the spacecraft, and a couple of options have been added for Continue in Game and for music selection during the game.

There is the beautiful soundtrack and also the spoken sound effects as in the 1981 title.

The Pal version is compatible with any emulator and on real machines and is free to download.

Shanti77 has again hit the jackpot by demonstrating his knowledge of Atari machines and his deep love of conversions. Perhaps one of the best Atari 8bit titles of these months.

by **Giampaolo Moraschi**

OUR FINAL SCORE

» Gameplay 95%
It is 100% coin op.

» Longevity 90%
Like the arcade game you will want to play one game after another.

NEW GAME

DUCK HUNT

Year: 2022
Developer: Mahna Mahna
Genre: Shooter
Platform: Commodore 64
Website: https://csdb.dk/release/?id=226342

What a beauty!!! The NES classic Duck Hunt has received a new C64 version from developer Mahna Mahna just days before Christmas. A conversion born for a demo competition and released on download platforms quietly.

Duck Hunt is a gun shooter created in 1984 by Nintendo for the Famicom and later converted for NES in the US market.

It was released in the United States in 1985 and also came to us in Europe in 1987. An arcade version of the title was made and distributed in various arcades of the time in the late 1980s.

The objective of the game was simple. To shoot moving targets on the NES screen with the Zapper, a gun/peripheral. But the player had only a limited number of shots (three) to do so.

If you shot all the targets, you would move on to the next level. Missing a certain number, you would be taunted by our ally Hound Dog and repeat the level.

Mahna Mahna played the Commodore 64 version of the title for this year's Transmission 64 3rd Edition event by finishing 6th in the final standings.

Compared with the NES version, it includes only two modes, A and B, which vary the number of ducks on the screen. You can use the mouse, joystick or a light gun in port 1.

You can even control the duck by inserting the joystick into port two. What more is there to say? The title is fun and still makes people smile today. It is made with care and detail, and graphically I found it delightful and masterfully converted.

A nice Christmas present.

by **Carlo Nithaiah Del Mar Pirazzini**

OUR FINAL SCORE

» Gameplay 85%
Play pattern perhaps repetitive but fun. Good challenge. It also supports lots of peripherals.

» Longevity 90%
Gradual level of challenge that glues you to the screen. Occasionally you will want to load it up.

NEW GAME

TOKI

Year: 2022

Editor: AmstradGGP

Genre: Platform

Platform: Amstrad CPC 128

It was back in 1989 and Akira Sakuma released Toki, a very classic arcade platformer in which you controlled a large ape who could shoot energy from his mouth and destroy numerous enemies.

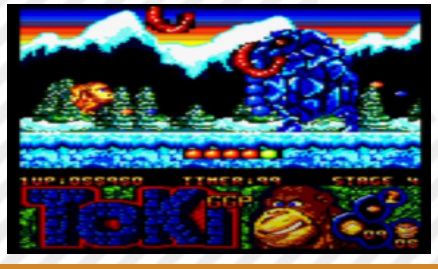
We gamers of the time found out through the introduction of the title that the ape was a man, transformed by an evil sorcerer who had previously kidnapped the protagonist's beautiful girlfriend.

The title was an incredible success in both the arcade and home versions and on any platform thanks to some excellent conversions.

So many years later, the AmstradGGP group delights us with a new conversion, this time for Amstrad CPC in floppy format.

Once again we are faced with a remarkable conversion. Of course we will not have everything identical to the original, but the level scheme and the affect in the game is that seen in the coin op.

A version on two floppy disks, perfectly compatible in emulation and on real machines, is available from the site.



After selecting the game language and pressing fire, you will wait for the loading that will take you into the first level and it's Toki right away.

There is, as I said, almost everything but what we see on the screen is stunning.

It moves fast and with excellent animations. Some might object to the very strong and in places confusing color choices, but you soon get used to it.

Another plus point is the soundtrack, reproduced with extreme care.

The game is still Toki. Difficult for those unaccustomed to these kinds of "old guard" titles and frustrating in places, but undoubtedly great fun. Recommended.

by **Giampaolo Moraschi**

OUR FINAL SCORE

» Gameplay 85%
Some things are missing but it is still Toki.

» Longevity 80%
...And like any good Toki, it is not for everyone.

STEVEDORE

Year: 2020/2022
Developer: TheNestruo
Genre: Platform/Puzzle
Platform: MSX
Website: https://thenestruo.itch.io/stevedore

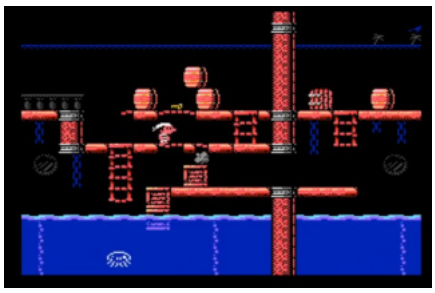
Stevedore works at the port, loading and unloading ships in a small coastal town. He is in love with his handsome lighthouse keeper. During the annual summer festival Stevedore rushes to finish the job in time to go to the ball with her.

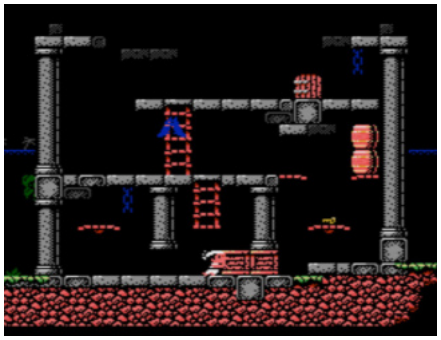
Suddenly the floor cracks under his feet.

Our hero finds himself in a huge abandoned warehouse and the goal will be to get out to "see the stars again." To do this he will have to traverse the levels by collecting keys, avoiding underground monsters and the many traps present.

I really like this title, it's addictive!

Structured like so many other platformers with logical elements to get out of paintings, but featuring a nice technical aspect and excellent gameplay.





The physics engine is superb. It allows for smooth gameplay despite very forgiving controls. There is a wide variety of enemies that are upgraded in the higher levels of the game.

These are very carefully crafted with a wide variety of themes, and as the adventure progresses, they are made more and more complicated to deal with.

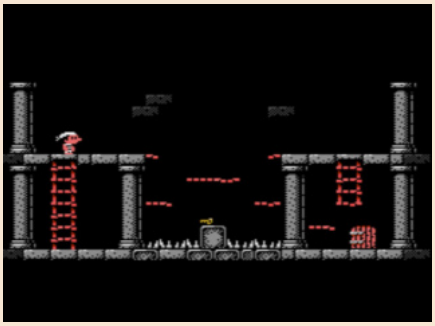
The physics engine is based on MSXlib with some modifications, and its author makes elucidations regarding development available upon contact.

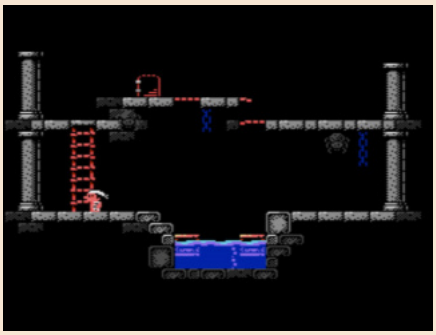
You can download the title from the official page or order it as a physical version on cartridge.

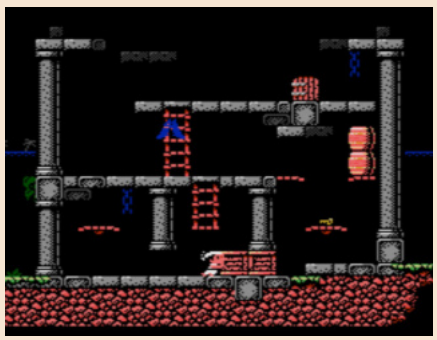
The physical edition contains the game cartridge, a beautiful full-color manual, and beautifully crafted packaging.

For yours truly one of the best recent products on MSX along with Lilly's Saga.

by **Carlo Nithaiah Del Mar Pirazzini**







OUR FINAL SCORE

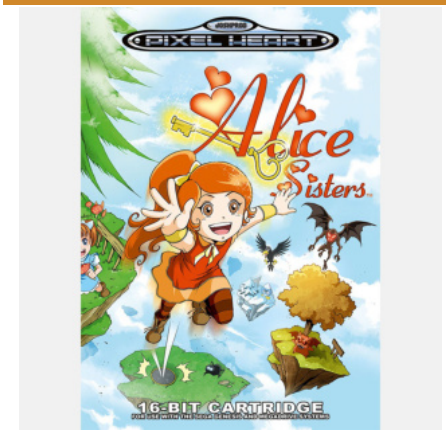
» Gameplay 90%
Perfect game engine and highly polished level design.

» Longevity 95%
One game leads to another... like cherries.

NEW GAME

ALICE SISTERS

Year: 2022
Editor: Pixel Heart/OrionSoft
Genre: Platform/Puzzle
Platform: Sega Megadrive/ Dreamcast/Steam
Website: http://onorisoft.free.fr/



A terrible mountain ogre has captured Alice's mom and her sister, so it's up to us to help the two girls save the thing they care about most.

It will be done by traversing 28 levels spread over 4 game worlds, each with its own mega bad guy to fight.

What a fun, colorful, and peculiar title Nith has given me to try for this time off from studying.

We will be guiding both sisters, whom we can summon by pressing a button during the game. Each has her own special power, Alice can change size through magic mushrooms to be able to pass through narrow passages, her sister can throw a magic projectile and jump higher.

This sets in motion essential combinations in order to move forward in the levels.

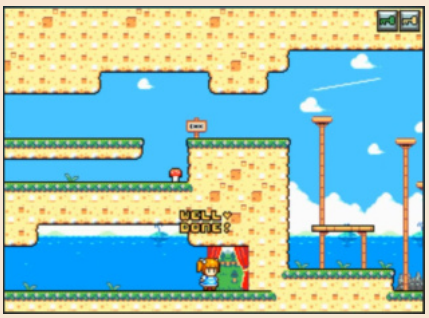
It is not the classic Super Mario, but a platform game that requires the use of some gray matter to be completed. And it is just beautiful to look at. Colorful, all well animated and with attention to detail.

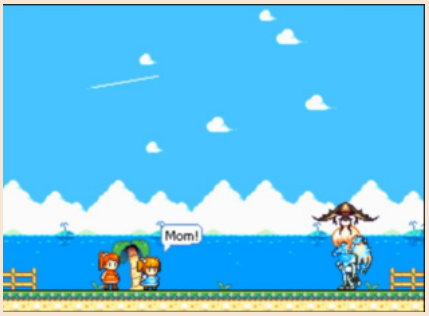
I had a great time playing the game and found the command system to be quick and easy to learn the character switch during the game.

It is an extremely replayable product with the 4 game modes: the easy with no death, the normal mode that allows some "help" during the game, the puzzle mode with really careful use of skills, and the hard mode with limited lives and time.

Beautiful, colorful and super fun. Run and try it out.

by **Ingrid Poggiali**





OUR FINAL SCORE

» Gameplay 90%
Lots of modes for lots of gaming fun.

» Longevity 95%
So many levels and consequently so many hours of fun.

KIKI KAIKAI ADVANCE (POCKY & ROCKY WITH BECKY)

Year: 2001
Editor: Altron/Natsume
Genre: Action game
Platform: Game Boy Advance

This was one of those titles missing from my collection! I am currently missing two and am turning the world upside down, they are very rare titles and those who were lucky enough to buy them a while back got a great deal.
The Game Boy is a very particular universe/console where titles have come out that need to be carefully selected ... and I've been doing this since 2017, not everything is Pokemon!
It is easy to like a nice picture where inside the GB they slap a random cartridge of the many Pokemon.
But back to us and let's look at the story:
""Long ago, a demon threatened Japan and a shrine maiden managed to seal him inside the temple. Now, the demon

has managed to escape and Pocky, Rocky and Becky must defeat it before it is too late."
A beautiful title set in feudal Japan between Oni and various Yokai and Yurei, where we will guide one of our characters (we can among the three main characters) to levels filled with insane creatures to get to the evil boss on duty by firing Ofuda scrolls and using our mystical fighting skills.
Derived from the series seen on Snes and in the arcade, this version was released exclusively on GBA with numerous extra goodies.
I couldn't help but swoop in to purchase this title, which has everything to be a gem. Playable, balanced difficulty and wonderful graphics/audio compartment.
But then you ... do you believe in the Spirits?

by **Barbara "Morgana" Murgida**

OUR FINAL SCORE

» Gameplay 90%
Another little gem of programming and careful level design.

» Longevity 90%
Beautiful in single player and resounding in multiplayer with multiple GBAs connected.

NEW GAME

PROJECT BLUE

Year: 2021
Editor: Broke Studio
Genre: Platform
Platform: Nintendo NES
Website: https://toggleswitch.itch.io/projectblue

Hidden on the outskirts of Dezone, a secret laboratory is conducting terrible experiments on homeless youths to turn them into devastating biological weapons.

The strongest test subject was named Project Blue. Strong, fast, and resilient. Blue manages to free himself as a result of an overly successful energy enhancement.

Our purpose is precisely to help him escape from the laboratory and uncover the terrible plot of the multinational corporation that runs Neo Hong Kong.

If you liked the Mega Man saga on the NES you will love this title. It embodies the spirit of it and also resembles its graphic style.

The story is less lighthearted and more raw, but the atmosphere, level setting, and play style is just such a well-executed homage to the CAPCOM saga.

Project Blue is a nice platform game that also requires some ingenuity, where we will guide our hero in a rather interesting adventure.

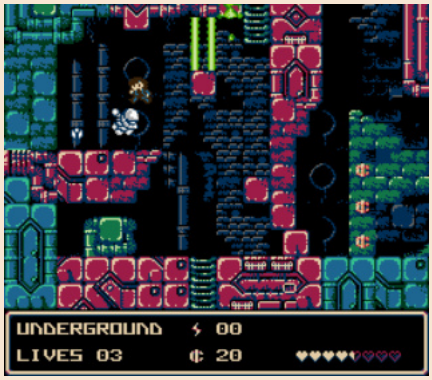
Well realized in two aspects. The graphic one that brings out the masterful work on colors and animations (really well done) and the sound one that features as many as 22 different tracks and numerous effects. All of them done really well.

The sore points are on the playability and difficulty side of the title. Some technical choices are not quite the best such as the physics of our protagonist's jumping that will often make us swear in numerous known and unknown languages.

Even some levels look like they were thought up by a first-rate sadist.

In short, a title that takes a hearty sufficiency and will be greatly appreciated by lovers of Mega Man, Rockman and company.

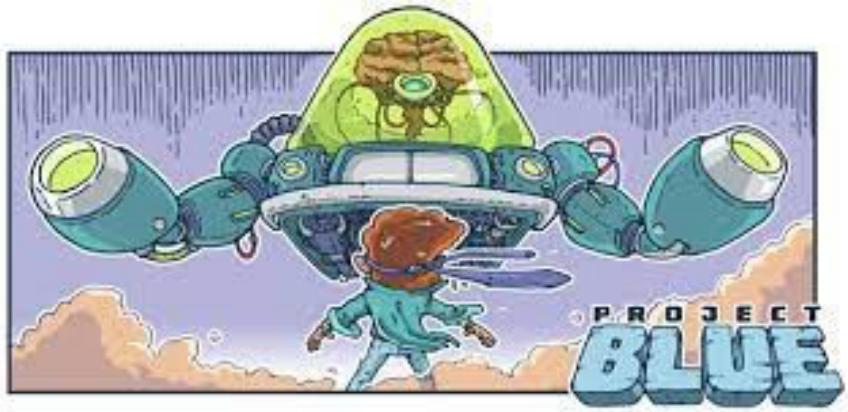
by **Carlo Nithaiah Del Mar Pirazzini**



OUR FINAL SCORE

» Gameplay 70%
The levels are interesting but some technical choices should be re-considered.

» Longevity 60%
The difficulty is not balanced and often it becomes very frustrating.



NEW GAME

SEGA'S WONDERBOY

Year: 2022
Developer: Acidbottle
Genre: Action
Platform: Amiga
Website: https://acidbottle.itch.io/amiga-wonderboy

Dark and dangerous forests... Endless oceans... Arid deserts full of danger... And then... Bam!!! You finally find your she, Tanya, kidnapped by the terrible and brutal evil king.
Wonderboy is back (returned) on Amiga in its most beautiful and resplendent guise thanks in part to the Scorpion Engine, which allows some past titles to be converted without too much difficulty.
It's all there. All 28 original levels, the axe, the scooter, secrets and enemies from the arcade game that made us fall in love with Sega's little blond mascot.
The Amiga version runs smoothly and there are no problems. We are at release 1.1 which has tidied up some incorrect collisions between sprites and added some animations.
The game is always super enjoyable to play.
A small masterpiece to upload.
Works on all Amigas equipped with 1 Mb chip and 1 Mb additional ram. 14mhz cpu or higher preferred.
It also runs on WinUAE and Amiga Mini, and there is a WHDLOAD installation via whdload.de.
In short, stop reading, go to download it!

by **Giampaolo Moraschi**

OUR FINAL SCORE

» Gameplay 95%
Immediate and unforgettable. Perfectly designed.

» Longevity 90%
Not simple, never dull and with the ability to keep you hooked on the game for hours.

NEW GAME

MUDDY RACERS

Year: 2022
Editor: Protovision
Genre: Driving game
Platform: Commodore 64
Website: https://www.protovision.games/shop/product_info.php?products_id=386

Monte Boyd pulled another little magic out of his hat.

Muddy Racers is a nice ¾-view driving game that reminded me of Rage Software's very playable Power Drive for Amiga.

It's about challenging other crazy racers on 18 tracks (on three difficulty levels) filled with curves, super-fast straights, dirt areas and incredible jumps.

It is set up to play up to 4 players or individually against the computer.

Present is the championship mode complete with a leaderboard and a time attack mode so you can challenge the best time recorded on the track.

In addition, the developer has created four characters with different "personalities" on the track: Torquei Tom, Nitro Nigel, Revvy Rick and Oily Olive.

During the game you can customize and personalize your car through a small shed-shop.

The tracks are not giant, but they are fun and fast-paced, and the level of challenge is gradual.

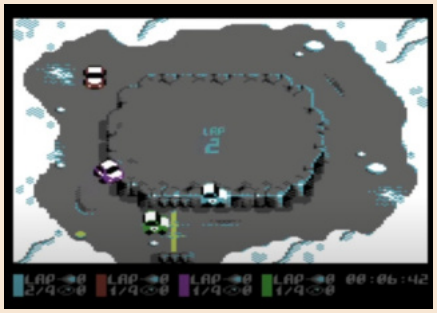
On real machine the multi-player adapter is supported, it is NTSC and PAL compatible, and it is also possible to play on THEC64 MAXI (on Mini there are some problems for multiplayer).

Really well-crafted technical compartment. Fast and colorful and with a "CHIBI" touch that makes it appealing to everyone. Beautiful soundtrack created by Kamil Wolnikowski.

Muddy Racers is a playable and fun title with virtually endless longevity that I recommend everyone buy.

There are two versions, the digital download containing the rom files and the physical version complete with box, manual and some gadgets. Your choice.

by **Carlo Nithaiah Del Mar Pirazzini**



OUR FINAL SCORE

» Gameplay 90%
A lot of options, difficulty levels, and attractive design. Definitely ok!

» Longevity 90%
Another well-realized title from Monte Boyd, in multiplayer becomes endless.

NEW GAME

TERRESTRIAL

Year: 2022
Editor: Psyktronik Software/ Icon64 Games
Genre: Multigames
Platform: Commodore 64
Website: https://psytronik.itch.io/terrestrial

Last minute game and Christmas game even though there is very little in the way of gifts, colorful decorations and merriment.
Terrestial is a multi-stage game where we will be tasked with protecting Earth and humanity from a terrifying and cruel alien invasion.
Each phase features a different game system.
The first phase is about taking off our aircraft (similar to Raid over Moscov), the second is about close combat with our turret against alien ships, and the third takes us into a frantic battle in a canyon (graphically beautiful).
The fourth phase is a city clash in the style of Cabal, the fifth phase is a graphically from the other between tanks, the sixth is a clash reminiscent of Space Invader, and the last phase is the decisive clash with the mega alien brain.
It is a game made with great care. It took time and hours of development, and on our facebook page we have talked about it several times.

Was it worth the thought? Yes, it is definitely a fun and above all dynamic title. It is not the same all the time and forces the use of different gameplay approaches at each stage. Is it a masterpiece? Not really. It is definitely a good title with some fun gameplay phases and some decidedly less so (e.g., the confrontation with the alien ships).
Praiseworthy is the phase in the canyon with graphics beautiful to look at and fast to play, and super pleasant is the tank battle.
I found the Cabal-style stage tacky, perhaps too forced.

I don't particularly like multi genre titles they are often too full of random things, but Terrestrial is worth testing. It may not be the best title ever, but it is certainly well-developed and fun.

by **Carlo Nithaiah Del Mar Pirazzini**

OUR FINAL SCORE

» Gameplay 80%
Some stages are well implemented, others a bit mechanical. The download file also contains the game manual that clarifies some aspects.

» Longevity 70%
It is a title that is not too difficult, but an occasional game is well worth the effort.

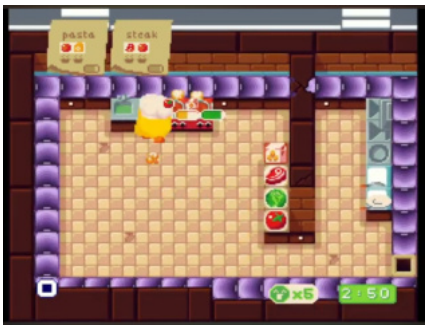
NEW GAME

SUPERCOOKED!

Year: 2022
Editor/Developer: SNESDEV Party
Genre: Action game
Platform: Super Nintendo
Website: https://goldlocke.itch.io/supercooked

Masterchef with fluffy chicks? Yes guys it's here! In my little hands and I'm happy about it.
Supercoocked! is a very nice and fun title just released on Super Nintendo. Weekends at Uncle Nith's house have become a regular date with this title. In the meantime, let us start by telling you that this is a game born out of passion. Made for an SnesDev Party in Germany.
An unpretentious, lighthearted, lethal and very "kawai" title.
The game allows for up to four players, aspiring chefs trying to climb the mountain of culinary excellence. The better the performance in the kitchen (by getting more stars), the greater the chance to advance in rank.
All based on a map reminiscent of Super Mario World, where we will guide our chick alter ego between restaurants, ordering and cleaning.
Yes! Not only will we have to cook but also clean the dishes, serve at the counter, chop the dishes and combine them. In short, hard work.

In addition, to make it fun you will have to watch out for the relentless ticking clock, the food that is in danger of burning, the customers in the middle of the boxes, and ... our opponents in the kitchen if we play with four of them.
A maximum of three stars are awarded for each stage, one for each of the following outcomes: completion of the stage, never losing an order/life, and achievement of the goal for the mission.
In addition, you will need to make order for the many required recipes.



In short, there is a lot to do in a seemingly very simple game.
I must admit that I was particularly taken with this title. It is well-developed, not too difficult to learn, but it requires a dose of mental and physical resilience to pull it all off.
Beautiful graphically and with a nice sound tune, it is a title that I highly recommend trying in the digital version (free) or buying the physical version on cartridge.
A beautiful Christmas party game that in multi-player becomes eternal. Super!
P.S. Happy New Year to all.

by **Ingrid Poggiali**

OUR FINAL SCORE

» Gameplay 95%
Simple commands, all assigned to the keys on the Snes pad. Well-structured missions.

» Longevity 95%
In single play it is fun but in four it is a virtually endless title.

WYVERN TALES

Year: 2018
Developer: Jasper van Turnhout
Genre: JRPG
Platform: Atari Lynx
Website: http://wyverntales.com/

Wyvern Tales is already a legendary title. It belongs to the endless stories of some titles for Atari Lynx: the author first mentioned it in 2012 and worked on it quietly (or with some videos) for years then nothing more.
At least until 2018 where it is released and does so in a beautiful style.
What is special about this title is that it is the first role-playing game for the Atari handheld console. The first and the only one.
Nice box, nice manual, and a nice cartridge all for about 50 euros, all orderable from Holland.
In a land ruled by gods and demigods, the inhabitants embark on a challenge to overthrow the guardians.
The game handles well with comfortable controls.
The directional pad is used to move adventurers around the main map and dungeon maps. In moving around you will encounter some random opponents who will bring battles to life. In addition, it is always possible to visit villages to find new items and useful clues.
In the menu screen, key A selects and key B takes you back.
In the movement screen of map A allows you to talk to non-player characters
The item selection menu and the inventory and equipment menu can

be accessed.
The latter can be increased through the many quests or by buying items in the stores.
Magic flows through the realm and comes in two forms: offensive and defensive. The former is composed of four types of elements: fire, lightning, ice and nature. Some enemies are more vulnerable to certain elements than others. The damage inflicted or health restored depends on the quality of the spell and the wizard's intelligence.
In conclusion we can finally smile and decree a good grade for this rpg for Lynx. It is fun and pleasantly engaging in its plot and mechanics. It is varied in its combat and exploration and never tires. The only complaint is about the causality of the fighting, which is often really too "random."
Beautiful graphics and excellent sound close the circle.
If you can retrieve it.
P.s. There is a news about the future release of the prequel called Wyvern Tales Gaiden also on Lynx (thanks to the guys at Atari World Italia for the news).

by **Giampaolo Moraschi**

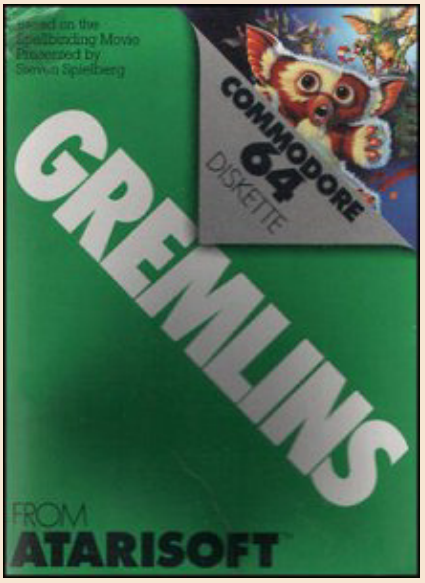
OUR FINAL SCORE

» Gameplay 95%
Unique on Lynx and easy to play. Dynamic, fun and complete.

» Longevity 85%
Not very long and difficult but addictive.

GREMLINS

Year: 1984
Editor: Atarisoft
Genre: Azione
Platform: Commodore 64



It's a Mogwai! This exclamation that accompanied many of us children and teenagers in the 1980s thanks to Gremlins, the film released in those years that was so popular and later saw a sequel made as well, rightly so. What's more, it was one of the most-watched movies at Christmas and I believe still is one of the most-watched. In addition to the movie, gadgets and gremlins mania, the cookie also put its own spin on it by receiving no less than three games: the first was the eponymous title which we will discuss in these pages, then Gremlins adventure game, a text adventure and finally Gremlins 2 which we will probably talk about in the next issues or next Christmas if you prefer. Well Retromagazine fans, let's set out to rediscover this tie in: the game is set at night and among the options we will be able to choose the difficulty, from the third onwards the greater the difficulties encountered. At the start, we find ourselves inside a fixed-screen room in which there are our Mogwai friends (good gremlins) to be picked up and brought to safety in the appropriate enclosure, being careful not to let them take food after midnight, otherwise they will turn into bad gremlins and we will have to clear them all over the screen with our swordsman. We will also have to avoid letting the mogwai come in contact with water, otherwise they will multiply, doubling our already hard work. The level can be considered solved when we have cleaned up the entire room; but there will be endless rooms, of higher difficulty, to give us hours and hours of fun, all accompanied by a soundtrack very reminiscent of that of the film. As a difficulty I consider it a fairly simple game and easy to understand. Personally, I do not remember seeing it between the shelves as its successor did, perhaps definitely more appreciated and played. Still, it remains a title that, thanks to its continuous loop (there is no real end) is played willingly. From time to time you pick it up again for a quick game thanks to those very peculiar funny little beings with big eyes who only need a mouthful after midnight to bring out the worst in you, or a drop of water on your head if one wasn't enough. Advice for progressing in the game doesn't seem necessary, but one I have to give you, as in every article after all: get the mogwai closest to you to safety and stay out of harm's way. If you see the others transforming, take them by the sword immediately otherwise the enemies will become numerous. Ah, if you see a mogwai above the puddle, don't be too alarmed because they are not very difficult to kill and at the end of the level they will earn you points since there is a special score for each one rescued. Since it is Christmas, I feel it is my duty and pleasure to give you another piece of advice.... Play it! On this magical Christmas Eve night, as I am playing and writing this article by candlelight and sparkling wine,

I can only wish you a Happy 2023 full of retrogames with many brand new releases that will surely await us in the New Year!

by **Daniele Brahimi**

OUR FINAL SCORE

» Gameplay 70%
A simple and also somewhat strategic game.

» Longevity 60%
It may be repetitive in the long run, however, an occasional game is a good amount of fun.

Dear readers, the news report that it is now possible to take advantage (still in beta version) of the GPT chatbot query from OpenAI (https://beta.openai.com), the consortium whose prime funder is Elon Musk, which was established in order to "ensure that general artificial intelligence brings benefits to all humanity."
In fact, for the past three weeks or so, many people, including myself, have been amazed at the responses generated by this AI to the wide variety of questions they have been asked. In fact, this software is capable of answering a wide variety of questions.
Questions such as "What is the date when man was able to reach lunar soil?" or "What is meant by quantum physics?" are good examples of such questions.
The answers provided by the chatbot are convincing and written quite correctly, in the same language that was recognized in formulating the question to which the corresponding answer is provided.
This is already remarkable. It is even more remarkable that the answers often turn out to be absolutely correct!
What is even more interesting, for retro-enthusiasts like us, is that even questions such as "write a BASIC program that calculates the solutions of a second-degree equation" manage to be satisfied.
I will tell you more. In the very early 1990s I was faced with a computer problem to solve. I was beginning to work with IBM AS400 processors, and I had to calculate the trigonometric sine of an arbitrary angle x, employing the RPG-III language.
Unfortunately, in the language in question the function sin(x) had not been implemented. I therefore had to think about it for a while to solve it. Eventually I thought of exploiting the Taylor-McLaurin series transformation in this regard.
I have already had a chance to tell you about this in issue #32 of RetroMagazine, within the article "RetroMath: Calculating the sin(x) function for 'hardcore' men."
Why am I still telling you about this matter?
I thought I would ask the chatbot for a solution to this issue.
In your first response you suggested code, but it employed the sin(x) function, and that code was written in RPG-IV syntax. In fact in its fourth incarnation the RPG finally provided for the sin(x) function.
At this point I asked the chatbot for a solution to my problem but did not employ the sin(x) function to arrive at the solution.
What did he provide me with? Some code, again written according to the syntax of RPG-IV (and thus for use with RPG-III would have to be modified), which, however, employs just the Taylor series to calculate the values of sin(x)!!!
This solution is still very young, there are limits certainly, but it promises to be very interesting. That is why we will talk more about it in our pages and we also invite you to test it, to discover the limits and potential of this chatbot that represents, even now, with its almost immediate and precise answers, the first, concrete, real alternative to Google!
And, as if that were not enough, he also manages to provide valuable material for us retro-enthusiasts.
That sounds like a splendid Christmas present to me, and a very good omen for a splendid New Year for all of us, don't you think so too?
Stay tuned, mind you, and best wishes from the entire editorial staff of RetroMagazine!

Marco Pistorio

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